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**Improving dairy cattle welfare:
*examining Motivational Interviewing,
veterinary communication and the
herd health advisory paradigm***

Alison M. Bard

A dissertation submitted to the University of Bristol in accordance with the requirements for award of the degree of Doctor of Philosophy in the Faculty of Health Sciences

Bristol Veterinary School, April 2018

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Abstract

Being a veterinarian is not just about science and methodology. In the dairy industry, encouraging and motivating clients to improve animal husbandry and adopt veterinary advice remains a critical challenge to improving animal health and welfare. Hence, veterinary communication - the bridge between veterinarian and farmer that enables the passage of ideas and advice on implementing change, one that can inspire motivation, arouse action and enhance confidence – is at the heart of farm animal well-being.

At present, there is a dearth of research exploring communication in the pursuit of behaviour change in the herd health advisory context. This deficit in understanding means there is little insight for advisors to support and inform their professional services to encourage behaviour change, nor is there theoretical basis for educators and trainers to tailor education packages to the specific needs and intricacies of this context.

This thesis presents research aiming to illuminate and enhance the intricacies of the herd health advisory paradigm, exploring how cattle veterinarians currently communicate in the pursuit of behaviour change, the factors implicit in the enactment of change for herd health and whether Motivational Interviewing (MI- an evidence-based communication methodology developed in the medical sciences) can be adopted in this context to facilitate greater farmer self-determination in the pursuit of herd health management.

Research findings suggest the MI methodology meets a skills gap in current veterinary communication and is congruent with veterinarian and farmer desires for the herd health advisory paradigm. Furthermore, feasibility testing of brief MI training suggests veterinarians can learn and apply MI within herd health consultations, with resulting farmer responses predictive of better advisory engagement and on-farm behaviour change outcomes. Drawing together these research findings, recommendations are made for MI to enhance veterinary communication with clients both within this research context and wider veterinary services.

Acknowledgements

The single name on the spine of this thesis is somewhat misleading. A PhD is simply not something you can conquer alone and I am truly grateful for the help, encouragement and support of a great many people during this adventure.

First, I would like to thank the British Veterinary Association Animal Welfare Foundation for funding this PhD, I am truly thankful for the privilege of receiving this studentship. Thanks also to all the veterinarians and farmers who gave their time and enthusiasm in support of this research, without your help this thesis would not have been possible.

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I would never have had the confidence to pursue a PhD without the encouragement of the following people, who deserve special thanks; Anne Carter, whose friendship and zeal for research put me on the pathway to this PhD when I had not even considered it a possibility; Claire Weeks, whose kind and enthusiastic supervision of my undergraduate research project gave me a taste for social science once more; Poppy Statham, who took me on as a fledging Summer student and gave me a thirst for all things research (and has supported me ever since) and Beth Loftus, who managed to make an eight week stint in the Observer room a fabulous summer, giving me the confidence to pursue this path (and as a desk buddy your help and support was my constant companion in both research and life).

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Last- and certainly not least- I would like to thank my family. First, my brother, whose passion and dedication to his creative world was an inspiration to see this PhD through (and who unwittingly provided the perfect soundtrack for writing a thesis). To my parents, for raising me with a curiosity for the world and everything in it, for never- ever- faltering in their belief that I could achieve anything I put my mind to and for whom no request for help, support or encouragement has ever been too great. Finally, to my husband, whose love, patience and sense of humour have been my safe haven throughout this PhD; *you are the reason I made it this far*.

Dedication

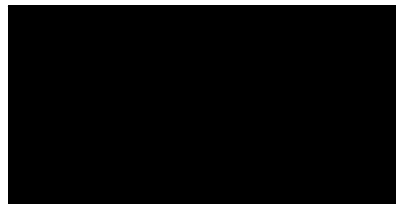
This thesis is dedicated to Phil James of Trehane Farm, the hardest working farmer I have ever met who inspired my passion for the wonders of dairy cattle. Who could have ever known that letting a rather stubborn 12-year-old spend all her worldly savings (£32 pocket money to be exact) on a calf at the market would set her on a lifelong adventure? I'm sure he had an inkling...



Declaration

I declare that the work in this dissertation was carried out in accordance with the requirements of the University's Regulations and Code of Practice for Research Degree Programmes and that it has not been submitted for any other academic award. Except where indicated by specific reference in the text, the work is the candidate's own work. Work done in collaboration with, or with the assistance of, others, is indicated as such. Any views expressed in the dissertation are those of the author.

Signed



Date **16.04.18**

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Chapter One

Introduction

*“A person is a fluid process, not a fixed and static entity;
a flowing river of change, not a block of solid material;
a continually changing constellation of potentialities,
not a fixed quantity of traits”*

Carl Rogers: On becoming a person

1.1 Research focus

The past 25 years have seen a major shift in the health management of dairy cattle. Veterinarians and farmers have moved their focus from individual animals to groups and herds, shifted from disease treatment to prevention, and are now equipped with extensive scientific knowledge and complex monitoring tools on both risk factors and management strategies associated with disease (LeBlanc *et al.*, 2006). However, despite these extensive scientific advances, the implementation of changes in on-farm housing and management of many diseases still appears to be inadequate. For example, lameness prevalence rates in the UK have changed little over the past two decades (Whay and Main, 2015). To make meaningful advances in herd health, the real challenge now resides in finding methods to effectively and consistently encourage the implementation of hard-earned scientific knowledge on farms (LeBlanc *et al.*, 2006). But how can we inspire farmers to engage with change?

The aim of this thesis is to understand this question, to determine how, and under what circumstances, UK dairy farmers engage with advisory recommendations on change and explore the efficacy of communication as a mechanism of engagement and inspiration. In this introductory chapter, the need for an enhanced understanding of behaviour change in the cattle veterinary context is evidenced and rationale for a focus on veterinary communication is established. Subsequently, the focal research areas of this thesis are introduced: the current state of UK cattle veterinary communication, farmer and veterinarian attitudes and perceptions towards the enactment of behaviour change in the UK dairy context and the feasibility for an evidence-based communication methodology (Motivational Interviewing) to enhance both veterinary communication and farmer engagement in advisory interactions.

1.2 Contextual Background

This chapter introduces literature pertinent to the research focus. First, current challenges in effective management of herd health are explored to evoke a detailed picture of the research context. Second, insights on behaviour change from the human health sciences are summarised to explore where theory-led intervention could enhance veterinary approaches to on-farm change. Third, the adoption of human behaviour change theory within dairy science research is reviewed to identify salient knowledge gaps; namely, the integration of (as yet) underused theories of change that focus on farmer self-determination as a route to inspiring change. Finally, a change-orientated communication methodology that manifests this focus on self-determination (Motivational Interviewing) is identified as an intervention focus. A review of the tenets and evidence base of Motivational Interviewing (MI), current veterinary communication and the unique features of the herd health advisory paradigm follows to offer insight into the applicability of the MI methodology as a research focus. Following this contextual grounding, Chapter Two summarises knowledge gaps identified to provide both overarching and specific aims for this research thesis. An outline of the thesis is then provided illustrating its narrative journey.

1.2.1 Herd health management and disease prevalence

The single biggest advancement in dairy health in recent decades has arguably been a paradigm shift in herd management, moving from the treatment of clinical cases to disease prevention (LeBlanc *et al.*, 2006). This shift has demanded an increasing recognition of the complex and multifactorial nature of almost all important diseases in dairy cattle, in addition to a broadening of the very definition of disease to include subclinical conditions that limit herd or animal performance (e.g. ketosis, rumen acidosis, subclinical-mastitis; LeBlanc *et al.*, 2006). In tandem with this paradigm shift has been an explosion in research and technology in the arena of herd health, ensuring the UK dairy industry is now equipped with extensive scientific knowledge and complex monitoring tools in both risk factors and management strategies associated with disease (AHDB 2018).

Despite this promising evolution of herd health assessment, in the face of these significant advancements it *'appears that the incidence of most conditions is stable, at best'* (LeBlanc

et al., 2006); the challenge is in effective and consistent implementation of research and technology (LeBlanc *et al.*, 2006), where individually some farmers are engaging and improving as a result of these tools and processes, whilst others are not. Illustrative of this assertion are two endemic disease in the UK, which will be used as representative of disease for exploration of farmer behaviour change throughout this thesis.

1.2.1.1 *Lameness*

Lameness can be described as any abnormality that causes a cow to change her gait. Lameness is most commonly associated with lesions in the claw, originating from infectious (e.g. foul in the foot, digital dermatitis) or non-infectious (e.g. sole ulcers, white line disease) causes, although other diseases of the skin, joints and bones, in addition to miscellaneous foot and leg conditions, can underlie this change (AHDB 2018a). Lameness poses a considerable welfare concern for dairy cattle, where lame cows exhibit behaviour indicative of physiological pain (Whay, Webster and Waterman-Pearson, 2005; Laven *et al.*, 2008), with their altered behavioural strategies suggesting a cognitive dimension to this experience (González *et al.*, 2008). There are also substantial financial implications for the farmer, with lameness costing on average £180 per incident, equating to approximately £15,000 in costs per farm, per annum accounting for mean incidence and herd size (a cost of well over 1p per litre of milk); (AHDB Dairy, 2018a).

Scientific research has implicated a wide variety of environmental, management and animal factors in lameness, allowing a multitude of advisory recommendations to be delivered on farms. However, despite these advances in knowledge, the level of lameness in UK dairy cows has remained high (Whay and Main, 2015). Recent estimates indicate the prevalence of lameness in UK dairy cattle at 36.8% (Barker *et al.* 2010), with comparable studies employing a four point locomotion scoring system (Table 1-1) indicating an increase in lameness prevalence over the last decade. Broad prevalence ranges (0-79%) within these studies also suggest that lameness is not unavoidable in dairy systems, with some farmers evidently able to successfully control the disease (Horseman, 2012).

Table 1-1. Lameness prevalence figures in the UK dairy industry
 *As indicated by three studies utilising the same mobility scoring system

Study	Prevalence	Range	Comments
Whay <i>et al.</i> , 2003	22.1	0 - 50	53 herds from the Midlands and South-West England
Huxley 2005 (cited Archer, Bell and Huxley, 2010; Horseman, 2012)	25	6.8 - 74.2	28 organic herds in South-West England
Barker <i>et al.</i> , 2010	36.8	0 - 79.2	227 herds from the Midlands, Wales and Southern England

1.2.1.2 *Mastitis*

Mastitis is an inflammation of the mammary gland and/or udder tissue. Any microbe able to invade tissue and cause infection can cause mastitis, however the majority of infections are caused by various species of staphylococci, streptococci and Gram-negative rods (Erskine, 2018). The magnitude of effect is dependent on mastitis type (clinical/subclinical), cause (major, minor pathogen), time of onset (relative to calving), infection persistence, host immunity and management control measures (De Vliegher *et al.*, 2012). The primary sources of these infections are classified, from an epidemiological standpoint, as either contagious (e.g. passed on by farmers hands, or equipment used during milking) or environmental (e.g. transmitted via bedding, teat dips, flies; Erskine, 2018).

Advances in management and diagnoses of mastitis have led to improvements in recent decades. Clinical mastitis has reduced from approximately 150 cases per 100 cows per year in the 1960s to 46 cases per 100 cows per year at present (Bradley *et al.*, 2007). However, data on clinical mastitis rates show huge variability, with Bradley and colleagues (2007) indicating nearly 25% of farms in their research (n=97) registering >100 cases per 100 cows per year. Average bulk milk somatic cell counts have also reduced from 573,000 cells/ml in 1971 to 200,000 cells/ml in 2009 (Biggs, 2009), yet this average still equates to approximately 20% of the national herd being infected.

Whilst levels of clinical and subclinical mastitis have arguably improved, they still reflect a considerable financial burden for farmers, and have significant welfare implications for cattle. Mastitis treatment and control is one of the largest costs to the dairy industry (AHDB, 2018) with costs for the average farmer estimated at £145, £436 and £1418 per affected cow per year for mild, severe and fatal cases, respectively (Kossaibati and

Esslemont, 2000). It can affect the profitability of dairy farming long-term, through negative effects on udder health, milk production, veterinary costs and culling risk, particularly when major pathogens are implicated in disease occurrence (De Vliegher *et al.*, 2012). Cow welfare is also infringed, with mastitis causing udder pain that increases with mastitis severity (Eshraghi *et al.*, 1999), leading to increased responsiveness to pain (Fitzpatrick *et al.*, 1998). This stimulates altered behavioural patterns, indicative of a cognitive component to this pain (Siivonen *et al.*, 2011).

1.2.1.3 *Entrenched challenges in adoption of herd health management practices*

The cases of these two endemic diseases reflect entrenched issues across the herd health spectrum - herd health parameters often fail to keep pace with advances in scientific research and technology. However, from a perspective of both animal and human wellbeing, there appears to be much to motivate farmers to eradicate these diseases. The most effective way to control herd disease is through consistent implementation of efficacious management strategies, informed by (aforementioned) advances in scientific research; for example, the effective control of mastitis demands optimisation of hygiene, milking regime, milking equipment, nutrition, host resistance and environmental conditions (Bradley, 2002; LeBlanc *et al.*, 2006). Limited and variable rates of reduction in UK lameness and mastitis in the face of extensive scientific advancement suggest endemic challenges in consistent implementation of control regimes. To make meaningful advances in herd health, the real challenge now resides in finding methods to effectively and consistently encourage the implementation of hard-earned scientific knowledge on farms: farmer behaviour change (LeBlanc *et al.*, 2006).

Achieving herd health and welfare improvement increasingly relies on veterinarians to train and advise farmers (DEFRA, 2004; FAWC, 2011), placing veterinary communication and advisory services at the heart of knowledge exchange. Veterinarians recognise their influence and the need to be proactive advisors but struggle with acting upon this awareness in daily practice (da Silva *et al.*, 2006; Mee, 2007). This struggle has been attributed to the need for better skills in understanding and influencing farmer behaviour in preventative herd health (Ruston *et al.*, 2016). Indeed, these feelings are so pervasive that veterinarians report challenges in influencing behaviour change as fundamentally undermining the preventative advisory role itself (Ruston *et al.*, 2016). As one ‘male partner’ in Ruston and colleagues’ (2016) veterinarian interview cohort

indicated, ‘*I think the battle ground is probably not on the science, the battle ground is on behaviour change and all this type of thing. So it’s not knowing more stuff that we need, we need to basically be able to implement it better.*’

In human health sciences, given the prominent contribution of behavioural factors to disease and death, behaviour change theory has flourished in the pursuit of effective health research, intervention planning and evaluation (Glanz and Bishop, 2010). Drawing on this extensive body of theory, research efforts in veterinary science aiming to characterise and influence the intricacies of farmer behaviour have also grown (Ritter *et al.*, 2017). Veterinary research has been dominated by the adoption of these theoretical frameworks from human health sciences, most notably the Theory of Planned Behaviour and the Health Belief Model (Ritter *et al.*, 2017). This has generated a plethora of studies in the ‘behavioural approach’ seeking to understand individual decision maker behaviour, focusing on psychological constructs such as goals, attitudes and values and employing largely quantitative methodologies (Burton, 2004). It is through careful examination of health science theory - and its application to veterinary science - that knowledge gaps in veterinary research can be highlighted.

1.2.2 The health sciences: human behaviour change theory

Literature on factors that influence human behaviour is incredibly extensive; it has been described as ‘enormous’ (Maio *et al.*, 2007), with the sheer volume of theoretical literature capable of ‘overwhelming’ researchers seeking to inform interventions (Pound and Campbell, 2015). As a result, a full review of the extensive theoretical literature illuminating behaviour change processes is outside the scope of this introduction. In lieu of an extensive exploration, dominant paradigms that contribute significantly to behavioural interventions in the public health domain in four scientific disciplines (sociology, psychology, anthropology and economics) will be summarised to offer an introductory insight into constructs of influence in consideration of farmer behaviour.

In a scoping review of theories of behaviour and behaviour change at the level of the individual across the social and behavioural sciences, Davis and colleagues (2015) identified six theories of the 82 reported in the literature that accounted for 70% of citations. Whilst this does not mean that these theories are fundamentally better than others - high citation rates may be confounded by year of publication, or reflect

familiarity, prior training, fashion, exposure or incentivisation (Davis *et al.*, 2015) - their prominence suggests insight into their features may illuminate dominant paradigms of thought within current health behaviour science. These six theories and their current state of evidence will be briefly reviewed to explore into their utility for informing veterinary science intervention.

1.2.2.1 *Transtheoretical model of change*

At the heart of the transtheoretical model of intentional behaviour change (TTM) is the assumption that behaviour change is a process that occurs incrementally (Prochaska, DiClemente and Norcross, 1992; Norcross, Krebs and Prochaska, 2011). The TTM offers an integrative framework offering insight into procedural features of behaviour change, whether the change represents initiation, maintenance or cessation of behaviour. Key components of this model are the five ‘stages of change’ that individuals pass through during behaviour change, processes through which change is viewed as a progression from (i) precontemplation (the individual is not currently considering change) to (ii) contemplation (the individual evaluates reasons for and against change) before reaching (iii) preparation (planning and commitment become established). If progress through these initial stages is successful, an individual is then able to (iv) take action (implement the behaviour change under consideration). Successful implementation of the action stage leads finally to (v) maintenance (the individual works to sustain change over time; (Prochaska, DiClemente and Norcross, 1992; Norcross, Krebs and Prochaska, 2011)).

These stages reflect the internal progression of an individual from being unwilling to engage with or unaware of the need for behaviour change to active consideration, determination and commitment, action and integration. In addition to conceptualising the change process, this model offers insight on how advisors can best support farmers. Different relational stances are suggested to produce optimal results at each stage, given the differing cognitive processes that are inherent within them (Norcross, Krebs and Prochaska, 2011). For individuals in the late stages of change, a consultant approach is appropriate; a change advisor may provide expert advice when action is not progressing smoothly. However, in the early stages of change, a change advisor will achieve optimum results through a relational approach; in precontemplation, nurturing and supporting the individual in assessing change; in contemplation, encouraging the individual to achieve

their own insights on their change; in preparation, coaching the individual in the planning of results (Norcross, Krebs and Prochaska, 2011).

TTM evidence statement

Research has isolated the stages of change across diverse health risk and health protective behaviours such as smoking cessation, dietary modification, gambling, alcohol and drug use, mammography screening, exercise adoption and pregnancy prevention (DiClemente and Velasquez, 2002). The saliency of these stages across diverse contexts prompted DiClemente and Velasquez (2002) to suggest that there is a fundamental structure to the process of behaviour change. However, a recent review of the body of evidence for the TTM suggests mixed outcomes; whilst a number of substantive analyses have reported findings that are consistent with TTM hypotheses on behaviour change, it is not possible to fully validate definable stages of change with available empirical data across a wide range of populations and/or health behaviour fields (Taylor *et al.*, 2007). With regards to informing behavioural interventions, a systematic review of appropriate literature (Bridle *et al.*, 2005) suggests that across a range of health behaviours there is only limited evidence for the effectiveness of TTM interventions; approximately three-quarters of RCT trials (n=37) failed to report positive outcomes. However, poor model specification and inappropriate intervention development and delivery were highlighted as potential literature flaws (Bridle *et al.*, 2005).

1.2.2.2 Theory of Planned Behaviour

The Theory of Planned Behaviour (TPB) focuses on ‘*theoretical constructs concerned with individual motivational factors as determinants of the likelihood of performing specific behaviours*’ (Montaño and Kasprzyk, 2015). This model suggests that intentions to carry out a behaviour are the best predictor of behaviour change (Montaño and Kasprzyk, 2015) and are the product of three factors: attitudes, subjective norms and perceived behavioural control (Figure 1-1; (Ajzen, 1991). For example, for a farmer to implement lameness or mastitis control measures, (s)he must first believe the disease is unfavourable (attitude), must believe that (s)he has a higher level of the disease than (s)he should (subjective norm) and must believe that (s)he can do something about the level of disease (perceived behavioural control).

TPB Evidence statement

The general theoretical framework of the TPB has allowed it to be used widely in health research, notably in exercise intentions and behaviours, weight gain prevention and eating behaviour, addiction and addiction-related behaviours as well as HIV prevention and condom use (Taylor *et al.*, 2007). The TPB is used widely in the retrospective analysis of health behaviour, with the significance of observed statistical relationships between TPB constructs across diverse contexts suggesting utility of the model (Armitage and Christian, 2003) and TPB explaining 21% of behavioural variance (Taylor *et al.*, 2007). However, a systematic review of TPB application (n= 30 studies; Hardeman *et al.*, 2002) suggests that the TPB is used infrequently to directly inform behaviour change interventions via design and predictive investigation and, when used, health benefits gained appear to be relatively limited. Additionally, intervention effectiveness was reported as unrelated to use of theory in development (Hardman et al. 2002). As presently specified, the TPB does not address issues of *how* behaviour change goals can most effectively be pursued, suggesting it can best be used to specify and explore the cognitive determinants of farmer behaviours as opposed to creating a ‘TPB-based’ intervention (Taylor *et al.*, 2007).

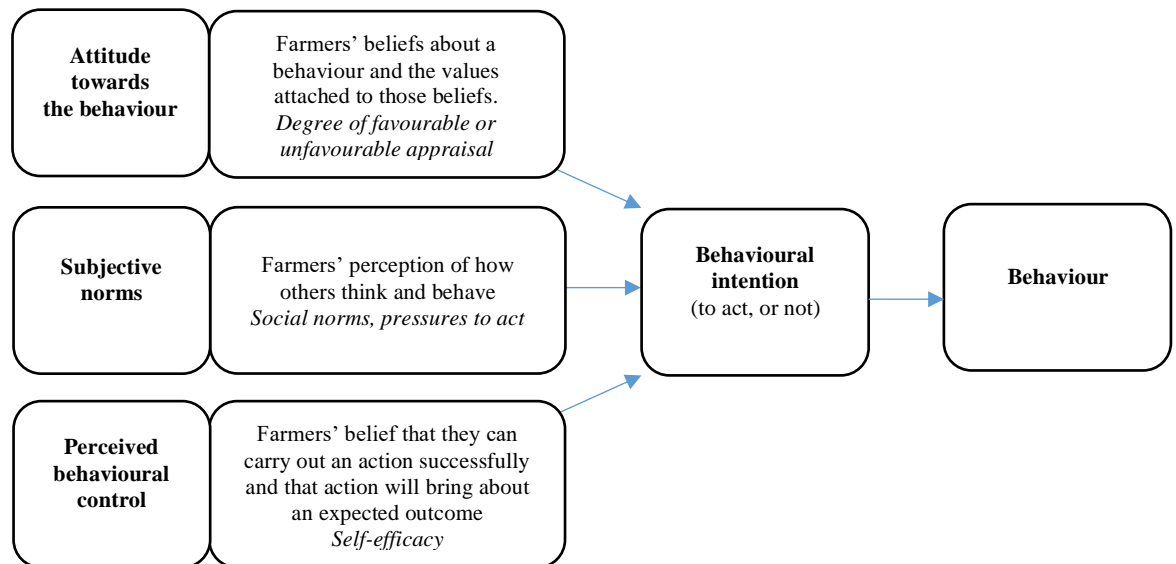


Figure 1-1. Determinant constructs in the Theory of Planned Behaviour (Ajzen, 1991)

1.2.2.3 *Social Cognitive Theory*

Social Cognitive Theory (SCT) proposes that individuals enact behaviour when they feel they have control on the outcome, they have confidence in their ability to execute the behaviour and there are few external barriers (Munro *et al.*, 2007). Central to SCT is the construct of self-efficacy, as it is thought to influence behaviour both directly (through individual belief in potential behavioural success) and indirectly (through influencing goals, barriers, facilitators and outcome expectations; Bandura, 2004).

These personal determinants contribute to a three-way reciprocal model in which personal, behavioural and environmental factors continually interact (Glanz and Bishop, 2010) known as *reciprocal determinism* (McAlister, Perry and Parcel, 2008). That is, our personal determinants influence behaviour, which in turn impacts upon our environmental life conditions which, in turn, feedback and modify our behaviour and personal factors. For example, a farmer may initiate a new lameness management behaviour through perceiving (i) minimal barriers to the behaviour, (ii) confidence in their ability to implement the behaviour and (iii) control on subsequent outcomes. When performing the lameness management behaviour, environmental feedback will in turn influence further behaviour; a reduction in lameness (positive outcome) will strengthen personal determinants, whilst no change or increase in lameness (negative outcome) will weaken them, leading to either maintenance or cessation of the initiated behaviour. It is the reciprocal interaction of these features that is suggested to be key to understanding behaviour (McAlister, Perry and Parcel, 2008).

SCT Evidence statement

Social cognitive theory has been applied in diverse contexts, including emotional disorders, mental and physical health, socio-political change, school achievement and career choice (Luszczynska and Schwarzer, 2005). Due to the wide-ranging focus of SCT, with extensive factors contributing to personal, behavioural and environmental components, it is difficult to operationalise and is often only examined or used in part (Munro *et al.*, 2007). For example, a systematic review of SCT in exercise research supports the model's efficacy by establishing *self-efficacy* as explaining 4-27% of variance in outcome behaviour (Keller *et al.*, 1999), yet the review did not contain reports of SCT examined *as a whole model* (self-efficacy is only one contributing factor). These

challenges in examination and full model integration call into question the applicability of the model in the development of interventions (Munro *et al.*, 2007) with authors calling for better implementation and evaluation of constructs in SCT research (Stacey *et al.*, 2015).

1.2.2.4 *Information-Motivation-Behavioural-Skills model*

The Information-Motivation-Behavioural-Skills (IMB) model, proposed by Fisher and Fisher (1992) in their exploration of HIV-related risk-taking behaviours, expounds three core constructs as determinants of engaging in a behaviour: information, motivation and behavioural skills (Figure 1-2; Chang *et al.*, 2014). For a farmer to change behaviour related to mastitis or lameness control, they must have positive personal beliefs and attitudes towards the behaviour and congruent social norms/social support for the behaviour (motivation), be well informed about the behaviour and have relevant heuristics (information) and have the behavioural skills necessary for implementation, both objective ability and subjective self-efficacy (Chang *et al.*, 2014). These constructs, as well as the explicit relationships between them (Figure 1-2) are considered generalisable within the health domain (Chang *et al.*, 2014) - an individual who is well informed and motivated is thought to develop behavioural skills needed for behaviour. Despite similarities between the IMB and antecedent model constructs (e.g. attitudes, intentions, subjective norms), it differentiates itself by establishing that intentions are not the most important nor most proximal predictors of behaviour. Intentions are instead subsumed under the category of ‘motivations’ posited to operate via the construct of ‘behavioural skills’ before enactment (John, Walsh and Weinhardt, 2017).

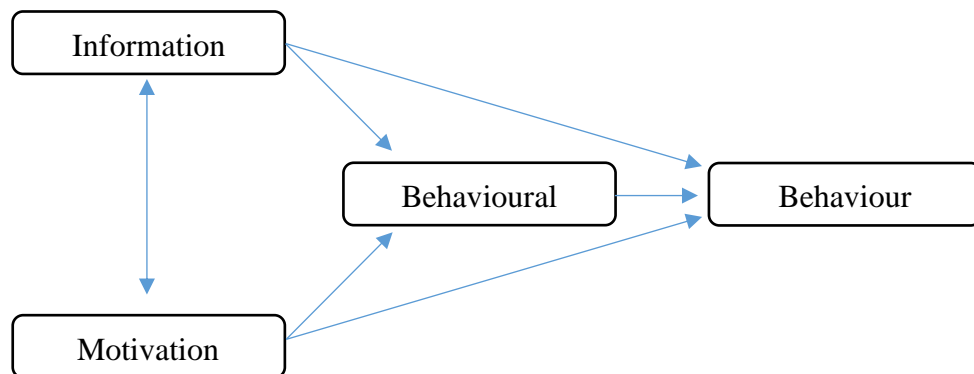


Figure 1-2. Determinant constructs of the Information-Motivation-Behavioural-Skills model

IMB evidence statement

The IMB model has accumulated considerable empirical support for information, motivation and behavioural skills as determinants for HIV-preventative behaviour in multivariate correlational research across diverse populations and behaviours (Fisher, Fisher and Harman, 2003). The IMB model is also viewed as highly generalisable, with a systematic review indicating the determinant constructs as correlated with health behaviour performance across diverse domains such as smoking cessation, nutrition, exercise behaviour, breast health and cardiovascular health (Fisher, Fisher and Harman, 2003). Systematic review of applied interventions drawn from the model suggest its applicability and effectiveness in behavioural interventions focused on risk prevention and self-care behaviours, yet issues exist in the operationalisation of constructs within these interventions (Chang *et al.*, 2014). Where ‘information only’ interventions are evidenced as unlikely to instigate change, considering these determinants’ effect on farmer behaviour in unison is critical; indeed, application of all three constructs increases intervention effect above ‘information only’ approaches (Fisher, Fisher and Harman, 2003).

1.2.2.5 Health Belief Model

The Health Belief Model (HBM) posits six determinants of behaviour in health management: perceived susceptibility to a problem, perceived severity of a problem, perceived benefits performing a behaviour, perceived barriers to performing a behaviour, perceived self-efficacy in performing a behaviour and perceived cues to action (where susceptibility and severity can be combined to create perceived threat; Figure 1-3; (Armitage and Conner, 2000). The HBM suggests that individuals make a ‘mental calculus’ regarding whether benefits of a behaviour change are perceived to outweigh associated practical and psychological costs (Green and Murphy, 2014). That is, for a farmer to enact behaviour in lameness management, they must first perceive their herd as vulnerable to the disease (susceptibility), that the presence of lameness would have potentially serious clinical, personal and/or social consequences (severity), believe that the management option available to them would result in reduced severity or susceptibility of lameness (self-efficacy) and believe the likely benefits of lameness management outweigh the likely costs (benefits and barriers). Additionally, cues to action - such as lameness management communication or lameness perception - may also

prompt performance of management behaviour. The model also acknowledges the influential nature of ‘modifying factors’ on these perceptions, accounting for diverse demographic, sociopsychological and structural variables such as farmer gender, personality and knowledge (Champion and Skinner, 2008).

HBM evidence statement

The efficacy of the HBM in predicting and explaining behaviour has been well documented over the last three decades via four meta-analyses (Janz and Becker, 1984; Harrison, Mullen and Green, 1992; Zimmerman and Vernberg, 1994; Carpenter, 2010). Whilst initial review supports the model’s ability to predict a variety of positive health behaviours (Janz and Becker, 1984) further reviews posed criticism: Harrison, Mullen, and Green (1992) suggested that HBM components are predictive of behaviour but with weak effect sizes, whilst Zimmerman and Vernberg (1994) identified that retrospective studies produced substantially larger effect sizes than prospective. The most recent meta-analysis (Carpenter, 2010) suggests inconsistent effects in determinants, with the strongest predictors consistently being the perceived barriers and perceived benefits of change, whilst perceived susceptibility was only weakly predictive and, in the majority of studies, perceived susceptibility was unrelated to behaviour. Whilst studies guided by

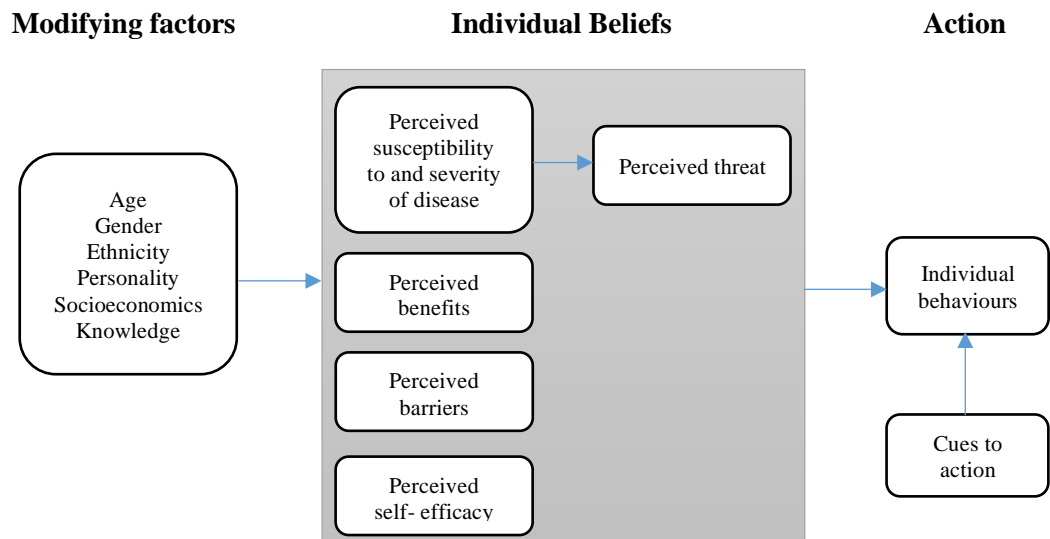


Figure 1-3. Health Belief Model components and linkages
(Reproduced from; Champion and Skinner, 2008)

the HBM generally reported significant improvements in primary outcomes, a recent systematic review of HBM-based interventions suggested a consistent relationship between HBM constructs and intervention success is lacking (Jones, Smith and Llewellyn, 2014). These data challenge the utility of the model as a theoretical basis for behaviour change interventions in the farm context but point to determinants of behaviour change that may prove significant (perceived benefits and barriers to change).

1.2.2.6 *Self-determination Theory*

Self-determination theory (SDT) is a theory of individual motivation for behaviour change that makes a critical distinction between behaviours that are accompanied by a sense of external control and pressure (those that do not emanate from one's self) and those that are volitional and accompanied by freedom and autonomy (Ryan and Deci, 2000). Comparisons between these conditions suggest that individuals who carry out behaviour autonomously have more excitement, interest and confidence than controlled individuals, even when individuals have the same level of perceived self-efficacy over the behaviour in question. Further, these levels of excitement, interest and confidence manifest as enhanced creativity, persistence, performance, well-being and self-esteem (Ryan and Deci, 2000). Notably - and in contrast to prior theory- SDT does not characterise motivation as a unitary concept split between amotivation and motivation, but rather as a quality that reflects degrees of self-determination. The theory therefore seeks to identify the conditions under which behaviours become (more) autonomous and self-directed, enabling prediction of the efficacious facilitation and maintenance of behaviour change.

SDT asserts that intrinsically motivated behaviours - those performed for inherent satisfactions rather than separable consequences - satisfy the innate psychological needs of autonomy and competence that are the 'prototype' of self-directed behaviour (Ryan and Deci, 2000). Those behaviours that are extrinsically motivated (e.g. are performed as they are instrumental to a separable consequence) are posited to vary in the degree they are internalised and integrated with the sense of self, resulting in differing motivational strengths (Figure 1-4). Deci and Ryan (2000) suggest that three factors influence this level of integration of extrinsically motivated behaviours: autonomy (sense of choice), competence (perceived self-efficacy) and relatedness (connection with another). SDT is

the only theory of motivation to explicitly recognise autonomy as a human need in behavioural regulation (Ng *et al.*, 2012).

This theory explicitly recognises that some activities are not intrinsically appealing, and the salient question is how to motivate individuals to value, self-regulate and (without external pressure) carry out and maintain them. As such, it is particularly pertinent to the context of herd health, as it considers not just how and whether a management behaviour is likely to be enacted, but the mechanism by which management behaviour can become self-directed and thus be maintained over time. As such, even if the behaviour is not intrinsically interesting for the farmer, ensuring the farmer 1) has choice in enacting the behaviour (autonomy), 2) feels efficacious with respect to it (competence) and 3) feels the behaviour is valued by those (s)he is connected with (relatedness) may allow the extrinsically motivated behaviour to become internalised within the self.

SDT Evidence statement

SDT has a history of strong experimental work on motivational factors underpinning the theory development (Ryan and Deci, 2000; Teixeira *et al.*, 2012) A recent meta-analysis (Ng *et al.*, 2012) of SDT in health care and health promotion settings concluded that the relations of contextual and personal SDT constructs with each other and with health outcomes supports the directions hypothesised in SDT. These relations were found to be generally consistent across health behaviour foci, study design and treatment settings (Ng *et al.*, 2012), suggesting the strength of SDT in the development of behavioural interventions. In their systematic review of SDT, exercise and physical activity, Teixeira and colleagues (2012) also conclude that current literature provides good support for the tenets of SDT (e.g. evidencing consistent support for a positive relationship between exercise and more autonomous forms of motivation, in addition to intrinsic motivation being predictive of long-term exercise adherence). In a systematic review, Silva and colleagues (2014) also positively report the ability for SDT to be faithfully integrated into behaviour change interventions.

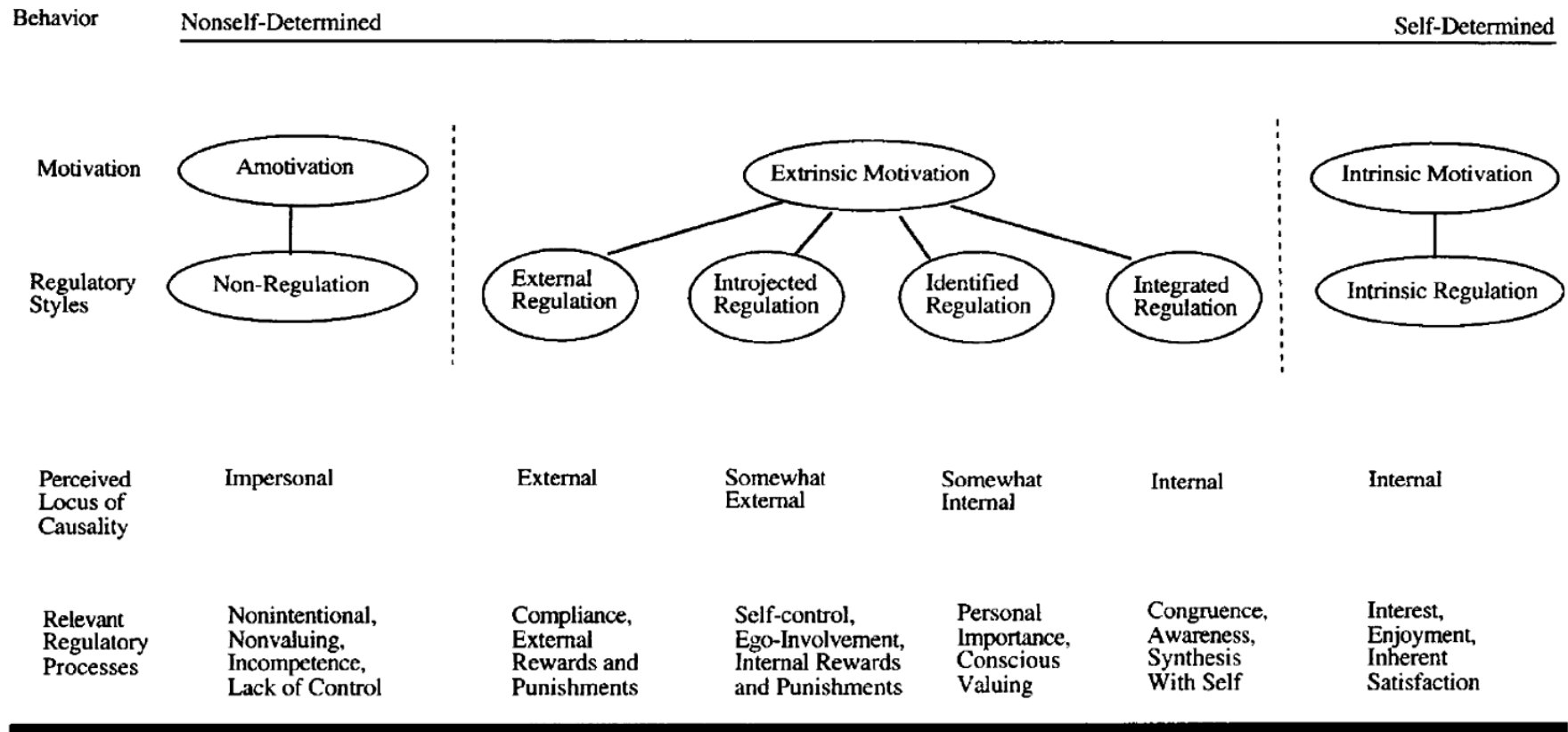


Figure 1-4 The Self Determination Theory continuum, showing types of motivation with their regulatory styles, loci of causality and corresponding processes (Figure cited from: Ryan and Deci, 2000)

1.2.2.7 *Summary*

Through the exploration of these six dominant paradigms contributing to behavioural interventions in sociology, psychology, anthropology and economics, several core observations can be made with associated suggestions for developing a research intervention in the dairy context. First, these models appear to be focused on different conceptualisations of behaviour change to guide recommendations: the TTM on the *process and unfolding* of behaviour change, the TPB, HBM, IMBS and SCT on *determinants that influence behaviour change as an outcome* and SDT on the internalisation and integration of motivation within the individual as *a facilitative condition for behaviour change*.

Second, whilst each model has a sound evidence base for construct efficacy, evidence for theory integration within behaviour change interventions is challenging, given problems measuring and operationalising constructs fully within interventions and/or inefficacy or paradigms in influencing behaviour outcomes. In meta-analyses the most encouraging evidence base identified relates to the enactment of the SDT model, suggesting integration of this theoretical perspective in dairy research and behaviour change interventions is a promising opportunity.

1.2.3 Utilisation of theory within veterinary science

Within the field of herd health research, a recent literature review published within the *Journal of Dairy Science* (a leading international dairy research journal) aimed to report a ‘*comprehensive understanding of influences and extension tools that affect farmer’s management decisions*’ (Ritter *et al.*, 2017). This paper stemmed from an awareness of the complexities and challenges implicit in inspiring farmer behaviour change and the fact that farmers regularly do not enrol in voluntary disease control programs nor adopt recommended prevention and control measures, despite the centrality of these practices to disease incidence and prevalence (Ritter *et al.*, 2017). The review intended to (i) review relevant published literature on farmer behaviour related to improving animal health (both factors that contribute to farmers’ adoption of recommended management strategies and the influence of social referents and extension tools on farmers’ management decisions) and (ii) make recommendations to support stakeholders (including veterinarians) to better motivate farmers to adopt best practice. The authors of this review include significant contributors to this research field in veterinary science. For the purposes of this thesis, this review will therefore be used as illustrative of the dominant paradigms adopted in veterinary science for the purposes of understanding farmer behaviour in herd health management.

1.2.3.1 *Dominant behaviour change theories within veterinary science*

Ritter and colleagues (2017) acknowledge two health behaviour models as dominant theories within the sphere of veterinary research: the TPB and HBM. In turn, in their own summary of critical factors contributing to farmers’ adoption of recommended management strategies, Ritter and colleagues (2017) explicitly recognise that the factors they selected often derive from the TPB and HBM constructs; namely, problem awareness, perceived responsibility, perceived effectiveness of recommended strategies, perceived behavioural control, knowledge, perceived feasibility/practicality and perceived benefits/disadvantages (Table 1-2). These factors are represented by the authors diagrammatically to indicate their interaction with change for herd health against a backdrop of modifying farmer characteristics (Figure 1-5).

Table 1-2. Core determinant constructs identified in Ritter and colleagues (2017) as critical factors that contribute to farmers' adoption of recommended management strategies

Determinant	Narrative summary	Example literature
Problem awareness	Farmers are less likely to change their behaviour if they are unaware or deny the negative future consequences of the current behaviour	In lameness assessment, 90% of farmers in England and Wales did not see lameness as a problem, despite 36% prevalence (Leach <i>et al.</i> , 2010)
Perceived responsibility	Farmers need to believe they are responsible for implementing the management strategies being advocated to take action	Cattle farmers positive perception of responsibility for the control of <i>Escherichia coli</i> 0157 is positively associated with willingness to expend costs on this issue (time, money; Toma <i>et al.</i> , 2015)
Perceived effectiveness of recommended strategies	Farmers will not take action if they do not believe that advised behaviour change will be effective in reducing pathogen prevalence, pathogen introduction or mitigating clinical cases	Positive perceptions of the efficacy of mastitis control measures are strongly associated with mastitis incidence and dairy farmer's adoption intent (Jansen <i>et al.</i> , 2009)
Perceived behavioural control	A farmer's positive belief in their ability to successfully implement behaviour change recommendations is necessary for enactment	A farmer's intention to improve dairy foot health is positively associated with perceived behavioural control (Bruijnjs <i>et al.</i> , 2013)
Knowledge	Sufficient knowledge on the disease in consideration and the necessary management strategies is critical for enactment	Attitudes to participation in disease control program (Johne's) are positively correlated with knowledge of the disease and its control methods (Benjamin <i>et al.</i> , 2010; Ritter <i>et al.</i> , 2015)
Perceived feasibility/practicality	Farmer must perceive behaviour change recommendations as feasible and practical to instigate enactment	Half of farmers consider lack of labour as an 'extremely important' or 'very important' barrier to lameness control in dairy herds (Leach <i>et al.</i> , 2010a)
Perceived benefits and disadvantages	The balance of the costs and benefits of behaviour change (economic, personal factors, animal welfare) influence farmer perception and enactment	Taking pride in being a good farmer (Leach <i>et al.</i> , 2010) and proof of long-term benefits exceeding immediate costs (Lanyon, Anderson and Reichel, 2015) influence the execution of management practices

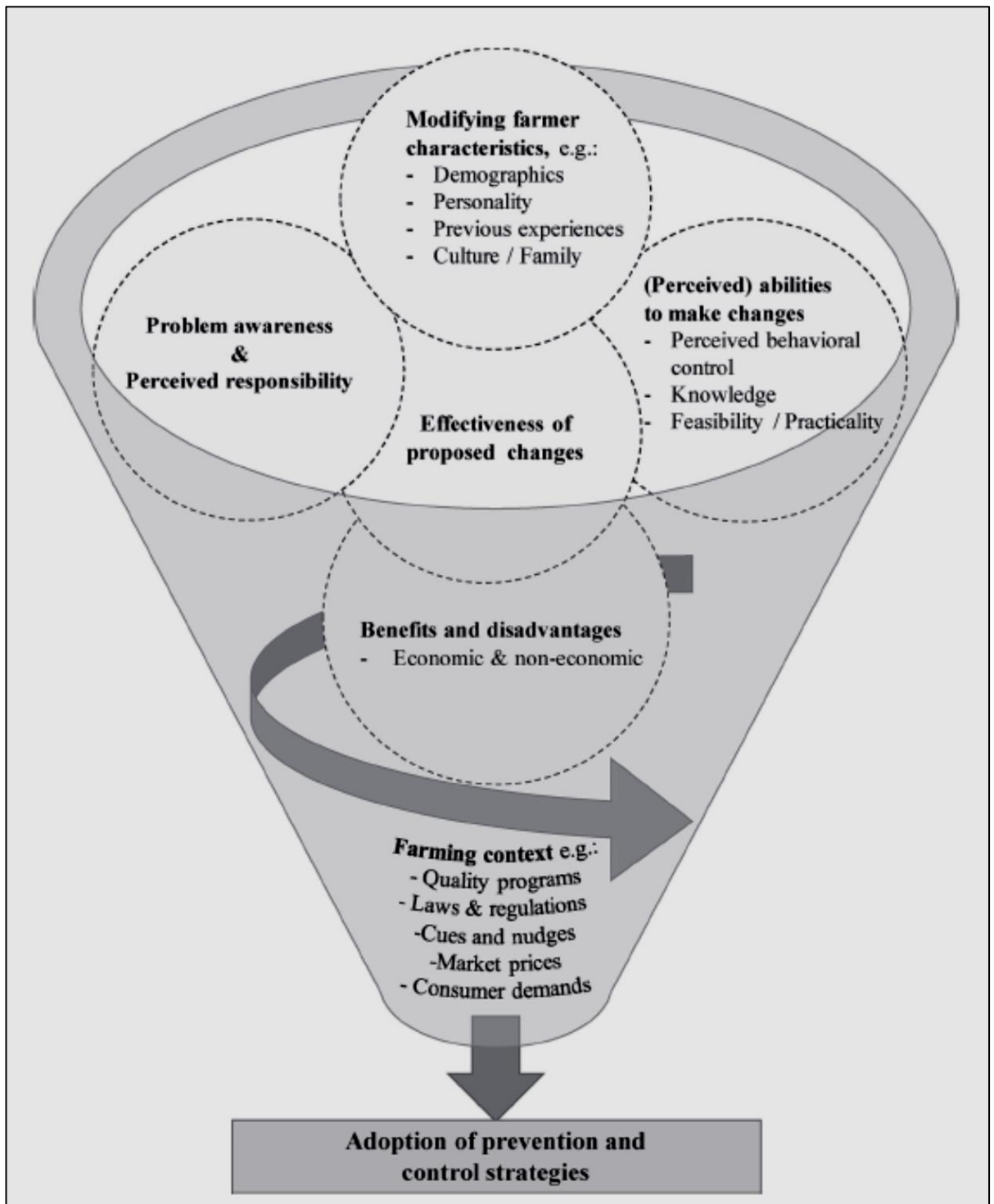


Figure 1-5. Socio-psychological factors that influence the adoption of on-farm management strategies for improved infectious disease management and control (Ritter et al., 2017)

In addition to these factors, the place of social referents and extension tools on farmer behaviour are discussed in detail; namely, mass media, peripheral extension tools, seminars and conferences, participatory group learning and individual communication. Ritter and colleagues (2017) identify that these aspects provide farmers with technical knowledge, whilst also creating expected standards or norms of behaviour that might cause farmers to experience social pressure and thus motivate the adoption of recommendations. Finally, recommendations to support stakeholders (including veterinarians) to better motivate farmers to adopt best practice are made throughout (summarised in Table 1-3).

Table 1-3. Recommendations for stakeholders to better motivate farmers to adopt best practice on farm (Ritter et al., 2017)

Desired outcome	Theme (s) of recommendations	Summary of points
Enhance problem awareness	Give information /compelling argument	<i>Confirm disease importance Provide guidelines on goal Inform farmers (of disease facts) Tell farmers (true state of issues) Clarify and justify farmers' responsibility</i>
Enhance farmer belief in strategy effectiveness	Give information /compelling argument, Set goals/plans	<i>Promote evidence-based recommendations Provide information Inform farmers (of previous success) Use demonstration herd/case studies Prepare farmers for time investment by setting goals</i>
Enhance farmers' perceived ability	Give information /compelling argument, Set goals/plans Support systems Demonstrations	<i>Disseminate sufficient information about the issue Customise recommendations Use structured risk assessment and management plans Create context to facilitate change (e.g. financially) Share stories of success Offer practical demonstration</i>
Enhance perceived benefits of control	Give information /compelling argument, Incentives/penalties Support systems Farmer as individual	<i>Raise awareness of benefits Prioritise low investment recommendations Consider financial support Consider incentives and penalties Use solutions that account for farmer concerns Address internal drivers</i>
Enhance extension tool success	Farmer as individual Educate Positive interpersonal interaction (skills, message consistency, tailoring, frequency)	<i>Offer diverse information as farmer's heterogenous Prepare advisors to educate farmers and clarify their role Provide education materials and training programs Encourage regular veterinarian/farmer interaction Train advisors in effective communication skills Maintain consistent messages across sources Tailor to personal preferences Consider peripheral extension tools for unmotivated farmers</i>

1.2.3.2 *Knowledge gaps in the application of behaviour theory in veterinary science*

The prominence of theories emphasising determinants of change

In this review, Ritter and colleagues (2017) explicitly acknowledge the dominance of the TPB and HBM in the field of veterinary science and recognise that the ‘relevant published literature’ they identify is similarly drawn from this literature base. This literature relates only to one type of theory identified in section 2.2; those focusing on *determinants that influence behaviour change as an outcome*. What is noticeably absent from this review are references, discussion or interpretation-based on theories relating to *the process and unfolding* of behaviour change (TTM) and the internalisation and integration of motivation within the individual as *a facilitative condition for behaviour change* (SDT).

This preference for determinants of change was not necessitated by the broad aim of Ritter and colleague’s review, which was to develop a ‘*comprehensive understanding of influences and extension tools that affect farmer’s management decisions*’. However, despite this broad aim, the title reflects how the authors selection of ‘relevant literature’ ultimately constrained these perceived influences to determinant factors: ‘***Determinants of farmer adoption of management based strategies for infectious disease prevention and control***” Given the combined experience and expertise in this research field of those in authorship, this focus on determinants of change is likely a valid representation of the application of change theory within the paradigm of herd health management change; namely an explosion of interest in understanding and exploring determinants such as attitudes, values, subjective norms, behavioural control and benefits/barriers to change.

There is, however, no claim that the review is systematic, so it is possible that this dominance of determinant-based research reflects selection bias on behalf of the authors. However, this theory dominance is also witnessed in wider reviews of veterinary research literature in this topic area, suggesting this is not likely to be the case. For example, Escobar and Buller (2014) explored current research and evidence gaps in understanding farmer behaviour (with respect to animal welfare) in a commissioned report by DEFRA and identified the same bias: literature focused on determinants of behaviour, in lieu of wider lessons and research opportunities within social science. This suggests that the evidence base within Ritter and colleague’s (2017) review is likely an apt reflection of core research foci within veterinary science, rather than a selection bias on behalf of the authors.

Indeed, extensive review of the veterinary science literature base evidences minimal contribution of the TTM or SDT theory in veterinary science. Integration of stages of change and the transtheoretical model can be found in discussion of farmer behaviour processes (Raymond, Wohrle and Call, 2006; Moore and Payne, 2007; Leach *et al.*, 2013) and appears in recent small animal literature with regards to advice on obesity communication (Churchill and Ward, 2016; Bartges *et al.*, 2017), yet research evidencing the efficacy of the stage constructs within farmer or other animal carer behaviour is not, to this author's knowledge, available. Similarly, there is a dearth of SDT literature. One exploration of SDT principles on the participation of farmers in competence development projects (Charatsari, Lioutas and Koutsouris, 2017) suggests SDT constructs are effective in predicting farmers' decisions to participate in management programmes, supporting the importance of generating the conditions that promote autonomy, choice and the capacity for self-direction in advisory interactions. Charatsari, Lioutas and Koutsouris (2017) noted '*this is the first study that uses an SDT framework to examine farmers' motivation*', illustrating the relative lack of exploration of this approach to conceptualising farmer behaviour change.

The emphasis in determinant-based theory in veterinary science appears to influence the types of recommendations presented for advisors, with Ritter and colleague's (2017) stakeholder recommendations dominated by variants of 'giving information' and 'compelling arguments' in the pursuit of influencing psychosocial variables (Table 1-3). Where negative psychological reactance to constrained choice and convincing arguments is well documented (Dillard and Shen, 2005) given the ambivalence clients often feel in making complex change, the potential conflict of these stakeholder strategies with behaviour change is salient. If farmers are ambivalent over their decision making (a recognised trait both in the transtheoretical model of change and qualitative examination of how farmers appraise complex herd health decisions; Jansen and Lam, 2012), these stakeholder recommendations are more likely to evoke a response *against* a behaviour change than in favour of it as a result of this reactance. The dominant theoretical paradigms underpinning insight into farmer behaviour may in fact be stimulating advisory choices that, for many farmers, create less interest and motivation to change as a result.

The appeal of deterministic models of behaviour rather than those focused on change stages or change internalisation may – in this author's opinion - be due in part to an alignment with the predominant relationship paradigm that exists between veterinarian

and client: one of paternalism, where the veterinarian takes on the role of the guardian in advisory interactions and leaves the client in a passive role (Shaw *et al.*, 2006). This relationship promotes a sense that veterinarians are the experts of change; that they are responsible for deciding on the most appropriate options for a herd and facilitating the change process, of finding the ‘right way’ to motivate a farmer. This paternalistic style of supporting farmers is built on a desire to help and is a typical helping response in many professional roles whose goal is to support clients to enact complex change (Miller and Rollnick, 2012).

Theories that emphasise change as an outcome readily match this relational identity, offering opportunities and insights to veterinarians on how best they can guide the motivation of their farmers by influencing these determinants. Indeed, the very terminology used by Ritter and colleagues (2017) in this review article echo this tendency: there is a total absence of the words ‘autonomy’ and ‘motivation’ (noun form - suggesting that change comes from the choice or personal momentum of the farmer) from the body of text, yet the word ‘motivate’ (verb form - inferring the action of an advisor instilling change in the farmer) appears nine times. These semantics present a contextual narrative where change is done ‘to’ a farmer rather than ‘with’ them, which is the essence of paternalism.

This review suggests not only a knowledge gap in the implementation of models emphasising internalisation of change within veterinary science (SDT) but a potential benefit to the veterinary profession of challenging it. Raising awareness and integration of models such as SDT that emphasise farmer autonomy and intrinsic motivation may encourage a shift in appraisal of the veterinarian-farmer relationship away from paternalism towards more partnership-based approach, recognised by industry as critical for the future of the UK veterinary profession business model (Vet Futures Project Board, 2015).

Relative paucity of intervention studies

Ritter and colleague’s (2017) literature review suggests that whilst the evidence base for relationships between psychosocial determinants and farmer behaviour is strong, there is a paucity of studies testing these relationships in intervention studies aiming to influence behaviour change. Of 152 references, only nine represent intervention studies in the context of veterinary science; a lameness control program based on HACCP (hazards

analysis and critical control point) principles (Bell *et al.*, 2009), national mastitis control programs for Australia (Brightling *et al.*, 2009) and the Netherlands (Lam *et al.*, 2013), the use of monitor farms as a tool for practice change (Campbell *et al.*, 2006), the use of stable schools to manifest change (Vaarst *et al.*, 2007; Ivemeyer *et al.*, 2015), the use of central and peripheral routes to influence udder health management behaviour (Jansen, Renes and Lam, 2010), the use of focus farms to influence Johne's control behaviour (Roche *et al.*, 2015) and a milk quality program to enhance mastitis outcomes (Rodrigues, Caraviello and Ruegg, 2005). Of these nine, only four mention psychosocial constructs and only three of these refer to a behavioural model or theory.

Whilst it is important to again note that this review is not systematic, this relative paucity of theoretically driven intervention studies selected as 'relevant' by Ritter and colleagues (2017) is perceived by this author as likely to reflect a known issue in veterinary research: the difficulty and 'intervention effort' required to utilise behaviour change models in animal health and welfare interventions (Whay, 2007). This relative paucity and contextual difficulty also represent a knowledge gap - a need for a 'low effort' and theoretically driven intervention for engaging farmers in positive behaviour change.

1.2.3.3 *Summary*

Initial review of behaviour change theory suggests SDT as the behaviour model with the most promising evidence base for theory-derived interventions, suggesting its potential to inform interventions aimed at influencing farmer behaviour change. In exploration of current veterinary literature, it is apparent that this model has not been widely used to inform research conceptualising farmer behaviour, nor to inform interventions aimed at enhancing it. Given the potential for this model to support a paradigm shift within the veterinary profession towards more mutualistic veterinary services - as desired by industry (Vet Futures Project Board, 2015) - this dearth of knowledge is a gap that must be addressed. The relative paucity of theoretically driven intervention studies contributing to a review of the farmer behaviour literature (Ritter *et al.*, 2017) also suggests that applied SDT research in the herd health management context (i.e. intervention-based) might represent the most valuable contribution to the veterinary literature base.

1.2.4 Integrating SDT principles within veterinary approaches to herd health behaviour change

Operational conditions for the core constructs within SDT have been advanced (Table 1-4) and can be considered in the design of SDT-based interventions (Silva, Marques and Teixeira, 2014). These conditions offer a variety of foci that could be explored in the delivery of support by veterinary professionals in programmes aimed at farmer behaviour change. However, as with all behavioural theory, operationalisation of theoretical constructs within interventions is not always straightforward (Silva, Marques and Teixeira, 2014). Adapting existing evidence-based applied methodologies that resonate with the principles of SDT offers a route to efficacious implementation.

One such methodology is Motivational Interviewing (MI), a communication model aimed at promoting behaviour change that has successfully been applied in a wide range of health behaviours (Miller and Moyers, 2017). The parallels between the MI methodology

Table 1-4. Operational conditions for core constructs of SDT, as summarised by Silva, Marques and Teixeira (2014) (direct citation)

Construct	Operational condition	Example
Autonomy support	Relevance	Clear and meaningful rationale for activities, facilitating self-endorsement
	Respect	Acknowledge perspective of clients' perspective, feelings, agenda
	Choice	Encourage clients to follow their own interests and provide options whenever possible
	Avoidance of control	Not using coercive, authoritarian or guilt inducing methods of language
Support for competence	Clarity of expectations	Collaboratively setting realistic goals, discussing what to expect and not expect from behaviour-linked outcomes
	Optimal challenge	Tailor strategies and goals to individuals' skills
	Feedback	Offer clear and relevant informational feedback (such as on goal progress) in a non-judgmental manner
	Skills training	Instrumental and practical training, guidance and support
Relatedness	Empathy	See the situation through clients' perspective
	Affection	Genuine appreciation and concern for the client
	Attunement	Careful attention to and gathering knowledge about the client
	Dedication of resources	Investing time and energy
	Dependability	Availability in case of need

and SDT have been detailed by various authors (Markland *et al.*, 2005; Silva *et al.*, 2008; Deci and Ryan, 2012; Miller and Rollnick, 2012) with their integration in behaviour change approaches established as a ‘fruitful marriage’ for research purposes (Vansteenkiste and Sheldon, 2006). The model of MI and theory of SDT share comparable origins; both developed as alternatives to theoretical paradigms that emphasised the external controls, criticisms or contingencies that can influence human behaviour (Vansteenkiste and Sheldon, 2006). For SDT, after initial studies suggested the undermining effects of external contingencies such as rewards, pressures and deadlines on motivation due to diminished self-initiation and autonomy (Deci, Ryan and Koestner, 1999), dissatisfaction mounted with the existing behaviouristic principles informing behaviour interventions (Vansteenkiste and Sheldon, 2006). For MI, dissatisfaction with prescriptive approaches in alcohol addiction treatment - focused on confronting and inducing fear in clients to mobilise change - prompted the development of an alternative communication method where the focus was on encouraging the client to engage in self-exploration and consideration of change (Miller and Rollnick, 2002) rather than have change forced upon them.

In their separate developmental trajectories in response to these contextual dissatisfactions, both MI and SDT have developed a common set of metatheoretical beliefs regarding positive human nature (Vansteenkiste and Sheldon, 2006). That is, that clients are growth-orientated, have a natural tendency towards personal development and change and the inner resources to facilitate such change; the task of an advisor is to facilitate this process and strengthen this inner resourcefulness, rather than impose motivation in the client from externally controlling strategies (Vansteenkiste and Sheldon, 2006). This similarity arguably underpins the congruence witnessed between the guiding principles of MI and the SDT psychological needs of relatedness, autonomy and competence, as highlighted by Silva and colleagues (2008; Figure 1-6). These congruent features of value also ensure that the principles advocated through SDT and MI are easily adaptable to the paradigm of herd health advisory services: they are a ‘content-free’ intervention approach, being primarily concerned with how a message is promoted (i.e. collaborative and supportive of autonomy rather than confrontational) instead of the content or focus of a message (Vansteenkiste and Sheldon, 2006).

Having previously identified two clear knowledge gaps - a need for further understanding and integration of SDT principles in the context of herd health research and the sparse body of theory led interventions reported as ‘relevant’ in this context - this ‘marriage’ of SDT theory and evidence-based communication methodology suggests a compelling opportunity: the exploration of an SDT approach to herd health advisory services through veterinarian adoption of MI, with the goal of enhancing farmer engagement and behaviour change. To explore whether this approach would meet the unique qualities of this context, the subsequent section will summarise the MI methodology and its evidence base in detail, assess whether the principles of MI are currently manifested in cattle veterinary communication and conclude with an exploration of the suitability of the approach for the advisory paradigm on farms.

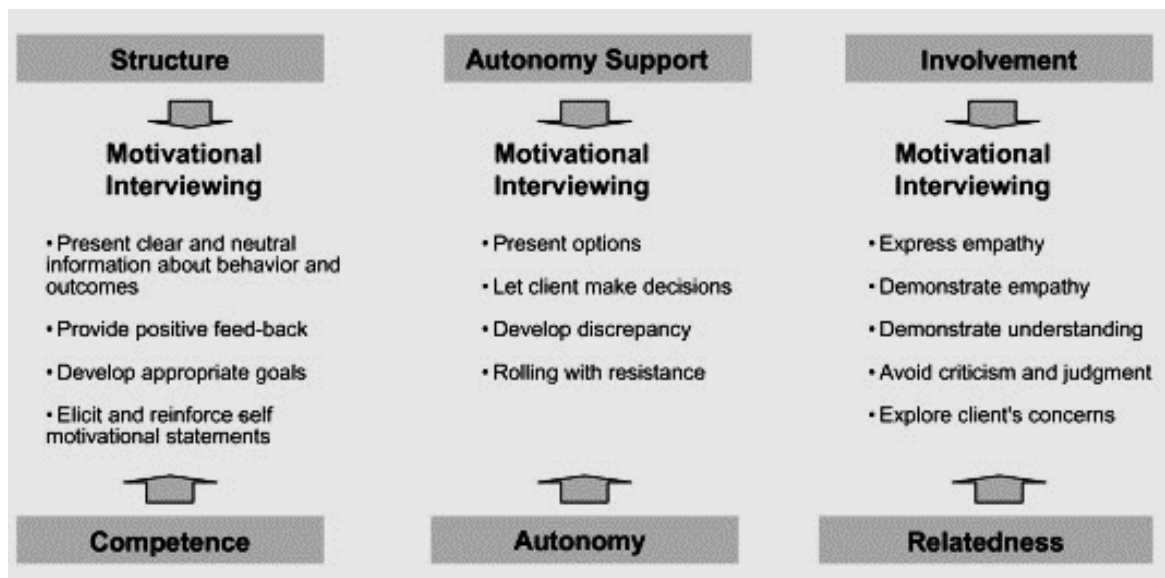


Figure 1-6. Relations between Self Determination Theory psychological needs and the guiding principles of Motivational Interviewing (Silva et al., 2008)

1.2.4.1 *Motivational Interviewing: overview and evidence base*

The MI methodology is a collaborative conversation style that aims to strengthen a person’s own motivation to change (Miller and Rose, 2009). MI practitioners aim to explore and resolve client ambivalence (seen as a normal stumbling block in changing complex, intractable behaviours with both costs and benefits) as a means of influencing the motivational processes that facilitate change, by evoking the client’s own desires, reasons and willingness to change to clarify and strengthen their positive intent (Moyers, 2014). There are two critical elements in this process: first, the relational component of

the methodology, which emphasises the cultivating of compassion (prioritising client needs), collaboration (equal partnership), acceptance (respecting client worth *as they are*), supporting autonomy (emphasising client control/choice), evoking rather than installing (drawing out, valuing and strengthening clients thoughts on change) and accurate empathy (actively trying to see the world as the client sees it and communicating this back to them). Second is the technical component, where MI practitioners focus on evoking and strengthening spontaneously occurring client speech that favours a desired change (called ‘change talk’). Practitioners learn to recognise client speech in favour of change and respond preferentially to it, whilst also learning to recognise and ‘soften’ or minimise language that is against a desired change (called ‘sustain talk’; Moyers, 2014).

At present, more than 500 controlled trials have been published examining the applicability of MI to myriad clinical problems, with systematic reviews and meta-analyses supporting the use of MI in the pursuit of positive behavioural outcomes (albeit not uniformly) in the fields of substance misuse, smoking cessation, diabetes, eating disorders, weight loss, adult and paediatric health behaviour, medication adherence and problem gambling (Miller and Moyers, 2017). In addition to this empirical validation, the methodology has been established internationally through a worldwide network of trainers, training seminars and training tools, with 3000 trainers representing 50 languages received preparation as trainers through the Motivational Interviewing Network of Trainers (MINT: <http://www.motivationalinterviewing.org/>) and MI texts now accessible in 27 languages (Miller and Moyers, 2017). This broad dissemination led Carroll (pg.1153 2016) to suggest ‘*[t]here is no other empirically validated therapy that has achieved this level of world-wide dissemination, including cognitive behavioral therapies or structured family approaches*’, argued by Miller and Moyers (2017) to be of salience as this outcome results from demand, with virtually no centralised effort to promote, market or advertise the methodology.

Empirical examination of the methodology has sought to illuminate the causal pathways of MI, given the breadth of contexts in which MI is efficacious in promoting positive behaviour change. Hypotheses for the effectiveness of MI focus on the causal chain between specific advisor verbal behaviour, client verbal behaviour and outcome change, namely, that those verbal behaviours that are especially consistent with MI (such as seeking collaboration, emphasising autonomy and reflecting change talk) are likely to increase the probability of client change talk (arguments for change) and decrease the

probability of sustain talk (arguments against change), which in turn predict the likelihood of a client enacting change (Miller and Moyers, 2017). Support for these causal chains is ‘relatively good’ (Miller and Moyers, 2017); better MI skills predictably increase both the strength and frequency of client change talk, whereas skills considered inconsistent with the methodology (such as low empathy, confrontation and giving advice without client permission) increase client sustain talk (Gaume *et al.*, 2010; Borsaria *et al.*, 2015). Subsequently, the evidence base supporting the link between client language and change outcomes is ‘promising’ (Miller and Moyers, 2017), with clients that offer relatively more change talk than sustain talk during advisory interactions more likely to implement change than comparable clients who offer more sustain talk than change talk (Morgenstern *et al.*, 2012; Walker, 2012; Gaume *et al.*, 2013). Finally, these effects have been evidenced across the full causal chain of advisor behaviour, client response and outcome change in four different laboratories (Moyers *et al.*, 2009; Vader *et al.*, 2010; Pirlott *et al.*, 2012; Barnett *et al.*, 2014) suggesting strong support for the mechanisms hypothesised (Miller and Moyers, 2017).

It is, however, important to note that this evidence rests primarily on correlational studies, meaning the relationships observed between advisor language, client language and change outcomes could be explained by another (as yet unrecognised) variable. For example, a client’s development of cognitive dissonance (discrepancies between actions and values) or her/his initial motivational strength may act to influence the causal chain (Miller and Moyers, 2017). Whilst in its infancy, empirical study aiming to clarify the specific impact of MI specific skills is therefore in process. For example, advisor ability to intentionally influence client language has been evidenced by Glynn and Moyers, (2010) who demonstrated using an ABAB design (A= MI, B= non-MI) for in-session communication that client change talk frequency is increased by deliberate use of MI strategies and can then be reversed to baseline without this deliberate use within a single session.

Overall, whilst contradictory findings have been reported, research on the causal chain of MI supports the theoretical connection between specific advisor verbal behaviour, client verbal behaviour and outcome change. Additionally, the wide dissemination of MI across diverse professional and cultural boundaries, combined with uptake of the methodology being a ‘content-free’ intervention approach, suggests the accessibility and adaptability of MI to novel environments. Combined, these details suggest the feasibility of cattle

veterinarians adopting this skill set to enrich conversations on behaviour change within farm clients. However, it is essential to understand how the MI methodology compares to current veterinary communication in the pursuit of behaviour change, in addition to how change-orientated communication is realised in the herd health advisory paradigm, to support the validity of exploring MI as an applied intervention.

1.2.4.2 *Characteristics of current veterinary communication: a place for MI?*

Research on veterinary communication has been dominated by studies of small animal practice. This literature base suggests that the predominant veterinarian communication style stems from the relationship dynamic established between veterinarian and client; that of paternalism, where the veterinarian sets the consultation agenda, takes on the role of the guardian and assumes that the client's values match their own, resulting in veterinarians contributing most of the talking and clients playing a passive role (Shaw *et al.*, 2006). This ensures veterinary communication is predominantly directive in style. For example, veterinarians use mostly closed questions, rarely employ empathetic statements in relationship building and rarely encourage client participation in appointments (Shaw *et al.*, 2004; McArthur and Fitzgerald, 2013). The ability to empathise is argued to be in the shortest demand (Martin, 2006), absent from 59% of consultations (n=64) observed by MacArthur and Fitzgerald (2013) and 93% of consultations (n=300) observed by Shaw and colleagues (2004) in the small animal context.

Within the large animal context, communication research is in its infancy, with scant literature specifically examining veterinary communication skills despite recognition in wider research that farmer's value this attribute (McArthur and Feakes, 2015). However, Jansen (2010) indicates similar behaviours to those witnessed in small animal practice in an assessment of recorded herd health consultations (n= 11, mean duration 96 minutes). Veterinarians in this study echoed the paternalistic approach, with less than 1% of spoken sentences evoking farmer opinion, only 4% of questions categorised as open and only three veterinarians pursuing agenda setting to open the discussion (i.e. collaborating on goals for the discussion). Additionally, no veterinarians used active listening during the interaction, defined by Jansen (2010) as paraphrasing farmer expressions to ensure mutual understanding, followed by searching questions to gain more insight into the issue at stake. This skill is the foundation of empathic understanding within a consultation (Rogers, 1986) and is significantly associated with measures of baseline advisor empathy

(Haley *et al.*, 2017). Indeed, paraphrasing (‘reflecting’) client statements is a foundational skill within the MI methodology in the promotion of empathic understanding of client perspective and emotion (Moyers *et al.*, 2016). Whilst farmers in this study still reported satisfaction with their veterinarian overall, this led Jansen (pg. 99, 2010) to suggest that tackling many barriers to the uptake of advice on farm could be achieved by veterinarians ‘*applying elementary communication techniques to their advice*’.

Recent exploration of large animal communication by Ritter, Barkema and Adams' (2018) offers further insight, who report communication data representing 21 recorded herd health and production management (HHPM) visits (veterinarians n=7, three consultations per participant). However, this study is a methodological assessment of the use of action cameras to analyse veterinarian-producer interactions, rather than a detailed breakdown of veterinarian communication behaviours. As such, not all results are provided from the use of the Roter Interaction Analysis System (RIAS: Roter and Larson, 2002) to assess veterinary dialogue, which commonly includes data gathering, client education and counselling, building a relationship, activation and partnership and procedural categories, with subcodes within each category (McArthur and Fitzgerald, 2013). Ritter, Barkema and Adams' (2018) study reports only data gathering, education and counselling and building a relationship, with the majority of subcodes absent. Nevertheless, data are worthy of discussion.

HHPM consultations (n=21) suggest approximately 37% of veterinary talk could be categorised as ‘education and counselling’ (which includes giving advice on animal husbandry and health) in addition to open questions accounting for only 1% of total veterinary talk (Ritter, Barkema and Adams 2018). These data suggest congruence of HHPM consultations with small animal consultation features (Shaw *et al.*, 2004; McArthur and Fitzgerald, 2013). A considerable proportion of time (41%) was allocated to relationship building, with verbal behaviours including positive talk (subcodes: agreements, approval, jokes, compliments) negative talk (subcodes: disagreement, criticism), social talk and rapport building (subcodes: empathy/legitimisation, concern, reassurance, partnership, self-disclosure) (Ritter, Barkema and Adams, 2018). Detail on verbal behaviour subcodes are not included, yet small animal veterinarian verbal behaviour analysed by McArthur and Fitzgerald (2013) with comparable relationship building proportions in the consultation found only 1% of relationship building

behaviours performed by veterinarians were ‘empathy’ and 0% of relationship building behaviours performed by veterinarians were ‘partnership’.

If Ritter, Barkema and Adams’ (2018) subcodes echo this communication pattern, it is possible to hypothesise that a similar directive approach was experienced by clients in the consultations studied. Empathy and partnership are critical to creating a mutualistic consultation approach; partnership ensures client autonomy and choice are engaged through collaborative and power-sharing statements (Miller and Rollnick, 2012), whilst empathy encourages seeking and communicating an in-depth understanding of client perspective and emotion (Rogers, 1986), critical to inspiring change; low advisor empathy is sufficiently damaging to the advisor relationship to be termed ‘toxic’ to patient outcomes in human health services (Moyers and Miller, 2013). The findings of Ritter, Barkema and Adams’ (2018) study cannot however be meaningfully interpreted without fuller detail on the constituent subcodes of coded verbal behaviour, so at best can neither support or refute the predominance of paternalism witnessed in veterinary services (Shaw *et al.*, 2006).

Given this, existing research focused on communication practice (rather than recording methodology) must be relied upon to provide insight into the herd health communication paradigm, which suggest the presence of this paternalistic style (Shaw *et al.*, 2006). Despite the intuitive appeal of this approach based on assumptions of persuasive efficiency (Gray and Moffet, 2010), as mentioned previously it is in fact more likely to elicit client reactions against a behaviour change rather than in favour of it (a phenomenon known as psychological reactance (Dillard and Shen, 2005) due to the ambivalence clients commonly experience in the contemplation of change. This directive approach also offers little opportunity to meet the basic psychological needs necessary for inspiring motivation highlighted by SDT and supported by empirical study (section 2.2.6): that of autonomy, relatedness and competence (Ryan and Deci, 2000). The predominance of this consultation approach across the veterinary sciences, combined with its conflict with basic motivational principles, may contribute to why uptake of veterinary recommendations are reported as low in a wide range of settings in both small and farm practice (American Animal Hospital Association, 2003; cited Abood, 2007).

Awareness of this issue is already taking hold in the UK veterinary profession. The VetFutures project (Vet Futures Project Board, 2015) collated the opinions and

experiences of veterinarians, veterinary nurses, practice managers and users of veterinary services to identify areas in which the profession should improve in the coming decades. One feature identified to meet the challenge of creating sustainable businesses and user-focused services was veterinary communication, with the report identifying a need for a professional shift away from paternalism towards a more collaborative, relationship-centred advisory style:

‘One of the fundamental drivers underpinning veterinary services may need to change – from a model driven by what vets are prepared to offer, to one that is driven by the needs and wants of existing and potential users of veterinary services...

This may require changing the nature of the discourse between veterinary professionals and clients – from a hierarchical model with the vet as the expert imparting instruction, to one centred on partnership with empowered clients and other veterinary-related professionals’ (pg. 46, Vet Futures Project Board, 2015).

Given current veterinary communication attributes (starkly in contrast to the relational components of MI emphasising collaboration, empathy and evoking) combined with industry recognition of the need to shift veterinary services towards partnership and collaboration to enhance outcomes, the applicability of the MI methodology to veterinary communication on herd health is striking. However, at present there is no literature (to this author’s knowledge) examining how cattle veterinarians specifically communicate in the pursuit of behaviour change for herd health; Jansen’s (2010) study states only that conversations on ‘regular herd health visits’ were recorded, which could encompass a variety of veterinarian intentions aside from behaviour change (such as clinical examination of cattle or descriptive feedback on productivity data). This is a clear knowledge gap in understanding the intricacies of how MI relates to the herd health advisory paradigm, demanding attention as the foundation of this research. Additionally, this understanding must be supported by exploring whether the MI methodology can be appropriately integrated within the herd health advisory paradigm.

1.2.4.3 ***The herd health advisory paradigm: a place for MI?***

The frequency and structure of herd health visits between a cattle veterinarian and dairy farmer will vary, depending both on the herd size (larger herds need more frequent and longer visits) and what is agreed to be part of the herd health programme between veterinarian and farmer (Green *et al.*, 2012). The exact construction of each visit will depend on a combination of the main goals of the herd health program and any major

problems in the herd. However, in general, dairy farms will require a weekly or fortnightly visit of two to four hours allocated time, providing time for regular assessments of the cows and their environment, data analysis and discussions thereof, essential assessments (e.g. mobility scoring, milking routine), discussion sessions with the farmer and any collaboration with external advisors (Green *et al.*, 2012). For example, Green and colleagues (2012) suggest that for an average 200-cow herd, a cattle veterinarian might expect to visit once every two weeks for ongoing management (fertility work, cow health, environment), allow one to two hours per month for data analysis (e.g. productivity, disease incidence) and factor in an extra four hour visit every four months to target a focal area (e.g. lameness management).

Whilst there are certainly farms serviced by the UK veterinary community that do not fit this template (e.g. on some farms veterinarians may fulfil a more technical than advisory role, as they emphasise fertility and reactive health or are less proactively involved in planning and evaluation), it is broadly reflective of the aim of herd health management within farm practice (Green *et al.*, 2012). Within this structure, it is apparent that there are distinct opportunities for change-orientated communication. Firstly, change-orientated communication could occur within routine visits, structured around other immediate tasks (including environmental exploration and the observation, handling and examination of dairy cattle). Second, this communication could occur within a more structured ‘data-orientated’ discussion, thought to (ideally) be present on any herd health visit as an update. Third, change-orientated communication could occur within consultations on a focal area (such as fertility, lameness, mastitis), separate from the restrictions of routine visits with protected time allocated. It therefore appears that, for the average cattle veterinarian, opportunities to communicate on behaviour change with dairy clients are (generally) frequent, suggesting that the training of veterinarians in the MI methodology may be a useful advisory skill with which to engage and inspire clients with herd health management change.

However, understanding whether MI fits within this context requires not just an understanding of the opportunity for communication on behaviour change, but an understanding of *how* these interactions are expected to be performed; when communication should occur, what features of the interaction are currently valued in the promotion of behaviour change and why advisory recommendations are currently enacted by farmers. This insight is critical to hypothesise how and whether an MI communication

approach could be readily integrated into cattle veterinarian communication, particularly given the divergence of MI communication from the paternalistic paradigm that is likely to dominate at present. If this paternalistic style of communication is preferred, or grounded in expectations of the local context, an MI-adherent communication approach may present too significant a conflict with the existing advisory paradigm to be perceived as useful by veterinarians and farmers in practice.

At present, literature abounds with evidence of *what* is talked about in herd health interactions and *why*, with regards to expected advisory topics, veterinary approaches to advisory discourse, perceived veterinary roles and advantages/disadvantages of the herd health advisory paradigm (Bell *et al.*, 2006; da Silva *et al.*, 2006; Sibley, 2006; Hall and Wapenaar, 2012; Derks *et al.*, 2013). However, qualitative insight into *how these interactions are expected to occur* between a veterinarian and farmer is, to this author's knowledge, currently unexplored, meaning an understanding of how, when and why a farmer may (or may not) enact an advisory message and the role of communication within this paradigm is unknown. Recent publications have suggested various 'human factors' implicit in the enactment of advice. For example, veterinarians report farmers' trust in veterinary knowledge and communication skills as important for implementation (Jansen, 2010), whilst the perceived role of the veterinarian, the relationship between veterinarian and farmer and the trust invested in this relationship combine to effect adoption of advice (Richens *et al.*, 2016). However, existing qualitative research tends to be driven by a specific disease or intervention focus, such as mastitis (Jansen, 2010) or vaccination (Richens *et al.*, 2016), with no qualitative literature examining the veterinary advisory paradigm in and of itself.

Without this fundamental understanding of the context, specific testaments to the applicability of the MI methodology to the herd health advisory paradigm can only be made practically (i.e. that there are ample communication opportunities for MI integration) but not relationally (i.e. it is not yet known whether MI is congruent with how veterinarians and farmers perceive advice, communication and behaviour change should manifest in their professional interaction). Where previous literature has identified the relational complexity of this advisory context, (e.g. Richens *et al.*, 2016), addressing this knowledge gap is critical in targeting an intervention in this context.

1.2.4.4 ***Summary: appropriateness of MI as an SDT-consistent intervention methodology in herd health advisory interactions***

In this section, the potential for a ‘marriage’ between SDT principles and MI has been evidenced, suggesting a viable intervention strategy for the herd health advisory context to encourage a focus on farmer self-determination in approaches to herd health management. A review of the evidence base and practical adoption of MI across diverse contexts suggests the feasibility of adopting MI within herd health advisory communication, whilst the stark disparity between MI skills and current veterinary communication indicates a strong rationale for doing so in the pursuit of positive behaviour change on farms. Finally, practical integration of the MI methodology within the herd health paradigm is possible for the (average) cattle veterinarian and farm client, given the frequency and structure of herd health visits. However, two knowledge gaps have been identified that need to be addressed to inform the development of an MI intervention: the need for detailed investigation of current cattle veterinary communication in the pursuit of behaviour change combined with qualitative exploration of the herd health advisory paradigm.

1.3 Summary

In this chapter, evidence suggesting endemic issues in the uptake on change on farm were highlighted, with examples surrounding lameness and mastitis management utilised to illustrate this issue. The ‘battle ground’ on behaviour change was identified as an issue of core concern for those working in a veterinary advisory role, with improvements fundamental for those in industry (Ruston *et al.*, 2016). Following this, lessons from the human health sciences were reviewed, with six most frequently cited theories in sociology, psychology, anthropology and economics literature (Davis *et al.*, 2015) explored for theoretical constructs and their evidence base. This review illuminated three core theoretical ideas around the instigation of change: those *predicting behaviour change as an outcome*, those identifying *the process and unfolding of change in stages* and those focused on *the internalisation and integration of change*, with the evidence base for the latter via SDT considered most promising for informing interventions.

With reference to Ritter and colleague’s (2017) core article in the Journal of Dairy Science, salient knowledge gaps in the application of these theories to understanding farmer behaviour change were identified. First, the need for adoption of theories aside

from those focused on determinants of change was identified, with a specific focus on SDT to (i) enhance the literature base, given the dearth of this material, (ii) stimulate more variable strategies recommended to advise in the farm context, given the relative dominance of information giving and compelling argument and (iii) stimulate appraisal of the paternalistic veterinary role, through novel construct ideas on autonomy and self-determination of farmers permeating the veterinary literature. Second, the need for an applied intervention approach was highlighted as the most valuable contribution to the veterinary literature base, given the dearth of studies of this kind.

Having highlighted the promise of SDT-led interventions, consideration was given to an applied manifestation of SDT principles through the evidence-based communication methodology of MI, whose alignment with SDT principles suggest a ‘fruitful marriage’ for change-orientated research. To examine the applicability of MI to the veterinarian-farmer context, current deficits in veterinary communication and practical opportunities for implementation within the herd health advisory paradigm were explored, suggesting the promise of MI in this context. However, two knowledge gaps must be addressed to target an intervention: an understanding of how veterinarians currently communicate in the pursuit of behaviour change and a qualitative understanding of how interactions occur within the herd health advisory paradigm.

Chapter Two

Thesis aims and outline

“So various, so discordant is the mind, that in our will, a diff’rent will we find”

John Dryden

2.1 Thesis aims

The principal aims of this thesis are to determine how, and under what circumstances, UK dairy farmers engage with advisory recommendations on change and to explore the applicability of MI (as an SDT-aligned methodology) to enhance the veterinary advisory paradigm for herd health management. The research hypothesis is that MI training will lead to improved veterinarian communication on herd health recommendations, creating a positive shift in farmer response to advice and thus an increased chance of positive behaviour change. This investigation of MI in the context of herd health is, to this author's knowledge, the first of its kind.

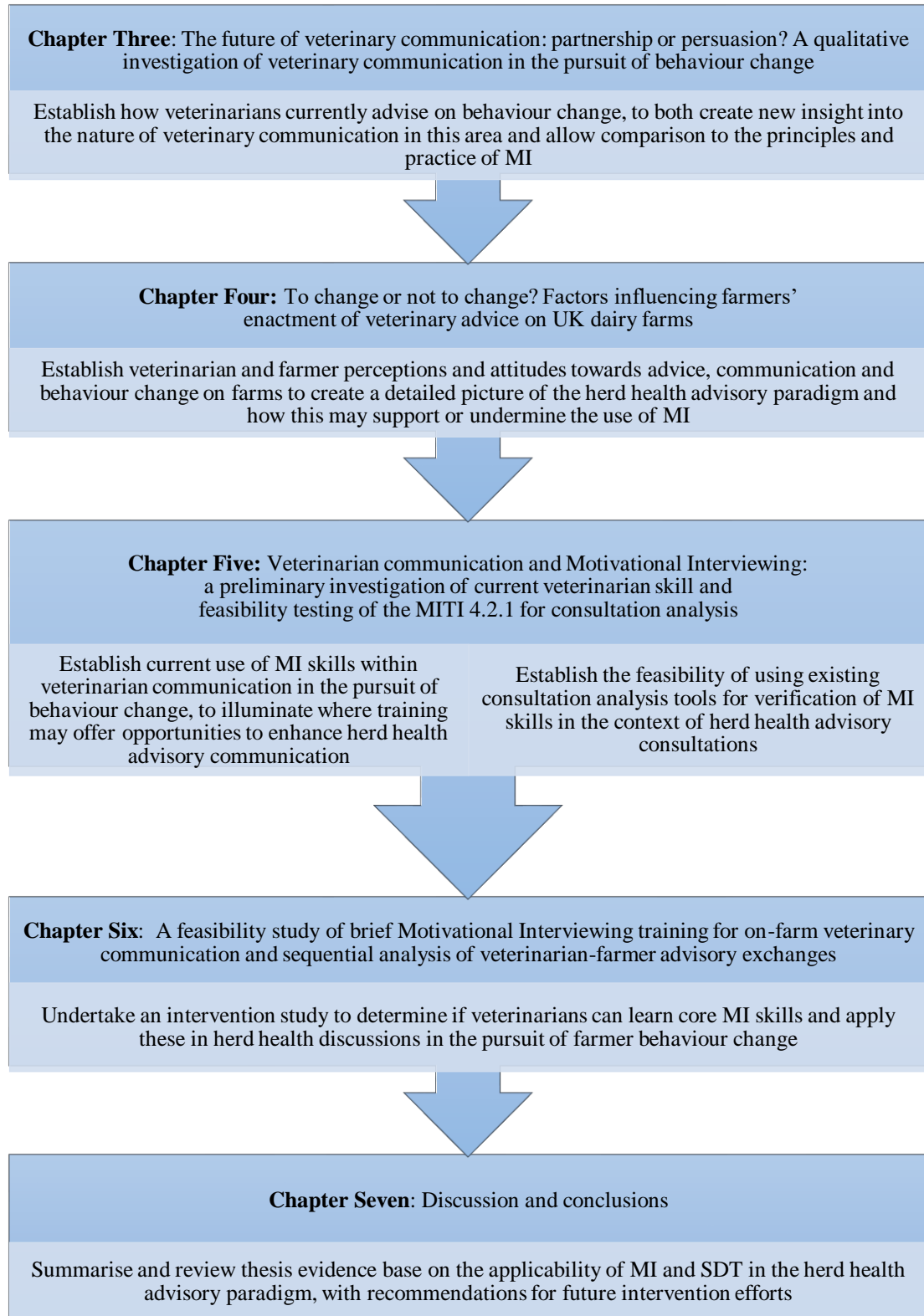
To test these hypotheses, five objectives must be achieved:

- (1) Establish how veterinarians currently advise on behaviour change, to both create new insight into the nature of veterinary communication in this area and allow comparison to the principles and practice of MI
- (2) Establish veterinarian and farmer perceptions and attitudes towards advice, communication and behaviour change on farms, to create a detailed picture of the herd health advisory paradigm and how this may support or undermine the use of MI
- (3) Establish current use of MI skills within veterinarian communication in the pursuit of behaviour change, to illuminate where training may offer opportunities to enhance herd health advisory communication
- (4) Establish the feasibility of using existing consultation analysis tools for verification of MI skills in the context of herd health advisory consultations
- (5) Undertake a feasibility study to determine if veterinarians can learn core MI skills and apply these in herd health discussions in the pursuit of farmer behaviour change, with the goal of informing further interventions

The structure of this thesis reflects these core aims, with four chapters exploring these core areas (Figure 2-1).

Figure 2-1. Content and structure of remaining research thesis chapters

Figure provides chapter title and the research aims addressed within



Chapter Three

The future of veterinary communication: partnership or persuasion?
A qualitative investigation of veterinary communication in the pursuit of
behaviour change

“I am dragged along by a strange new force. Desire and reason are pulling in different directions. I see the right way and approve it, but follow the wrong.”

Ovid, *Metamorphoses*

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For author contributions see:

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Abstract

Client behaviour change is at the heart of the herd health advisory paradigm, where promoting cattle health and welfare is often synonymous with engaging farm clients in animal management practices. In the medical realm, extensive research points to the link between practitioner communication and patient behavioural outcomes, suggesting that the veterinary industry could benefit from a deeper understanding of veterinarian communication and its effects on client motivation. Whilst extensive studies have *quantified* language components typical of the veterinary consultation, these studies are predominantly focused on the small animal context, whilst the literature is lacking in-depth qualitative analysis of veterinarian communication behaviour. The objective of this chapter was to address this deficit and offer new critical insight into veterinary communication strategies in the pursuit of client behaviour change for herd health.

Role-play interactions (n=15) between UK cattle veterinarians and an actress experienced in medical and veterinary education were recorded, transcribed and analysed thematically. Analysis revealed that, overall, veterinarians tend to communicate in a directive style (minimal eliciting of client opinion, dominating the consultation agenda and prioritising instrumental support), reflecting a paternalistic role in the consultation interaction. Given this finding, recommendations for progress in the veterinary industry are made, namely the integration of MI as an evidence-based approach to enhancing conversations about change for herd health. Use of this methodology may facilitate the adoption of a more mutualistic, relationship-centred communication in farm animal practice, supporting core psychological elements of client motivation and resultant behaviour change.

3.1 Introduction

The protection of animal health and welfare is central to the cattle veterinarian identity, conveyed and embedded via their oath upon admission to the Royal College of Veterinary Surgeons; ‘*I promise... that, above all, my constant endeavour will be to ensure the health and welfare of animals committed to my care*’ (RCVS, 2018a). Fulfilling this oath is complex, requiring not only the scientific expertise on animal health gained via training in veterinary science, but the ability to effectively communicate this expertise to farmers to encourage its implementation through behaviour change (whether by administering treatments, enacting management processes, or a multitude of other actions).

Communication training has received increased emphasis over the last decade, with all UK veterinary institutions now teaching the Calgary-Cambridge model (posited by Silverman, and colleagues 2013) to enhance clinical communication skill and improve client outcomes (Mossop *et al.*, 2015). This model emphasises six stages to the consultation process (Figure 3-1), encompassing observation/examination of the client, providing structure to the consultation and building the relationship with the client. Whilst the Calgary-Cambridge model is useful for curative consultations in herd health-emergencies, acutely sick farm animals and some management related issues - its utility

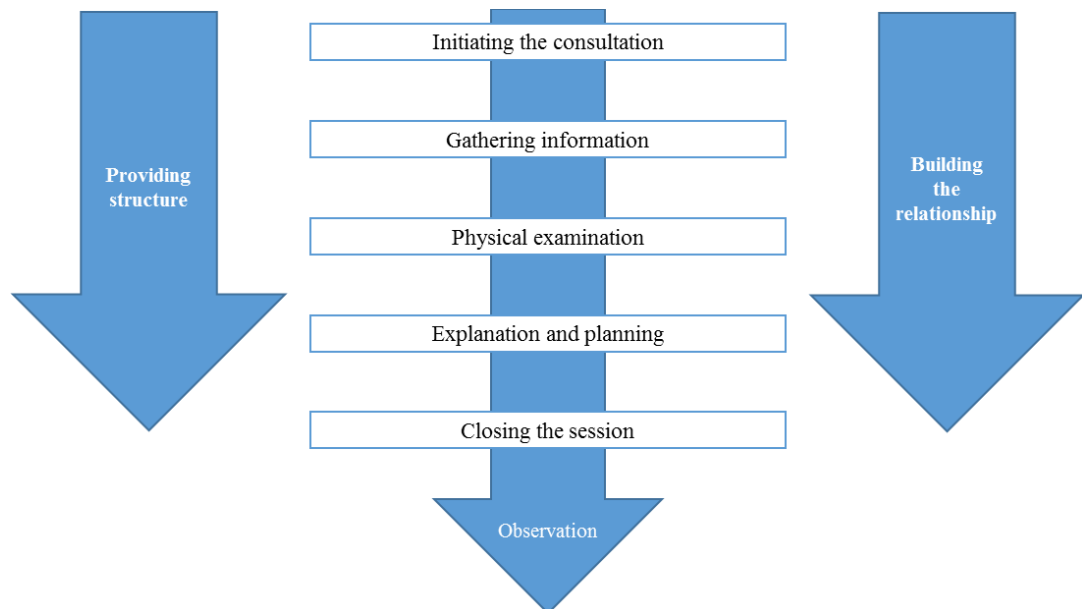


Figure 3-1 Consultation stages in the Calgary-Cambridge model. Adapted from Radford and colleagues (2006) for illustrative purposes.

in a herd health advisory role in the pursuit of behaviour change has been questioned, given the need for complex and long term discussions to get at the root of herd issues (Kleen, Atkinson and Noordhuizen, 2011).

This conflict may be why, despite this recognition and teaching of the Calgary-Cambridge, veterinarians in farm practice still struggle with the dual role of scientific advisor and proactive communicator (Mee, 2007; Jansen *et al.*, 2010). Indeed, the ‘battle ground’ on behaviour change is identified as an issue of core concern for those working in a herd health advisory role (Ruston *et al.*, 2016). These challenges in positive engagement are evidenced by low rates of adherence with veterinary recommendations; for example, little change has been seen in the prevalence of lame dairy cattle in decades, despite extensive scientific research on risk factors and management strategies implicit in their occurrence enhancing veterinary advice (Whay and Main, 2015), whilst progress with many herd health disease is described as ‘*stable at best*’ (LeBlanc *et al.*, 2006).

A second concern specific to communication on behaviour change is the relational dynamic between veterinarian and client. In veterinary interactions, the predominant approach is that of *paternalism*, where the veterinarian sets the consultation agenda, takes on the role of the guardian and assumes that the client’s values match their own, resulting in veterinarians contributing most of the talking and clients playing a passive role (Shaw *et al.*, 2006). This ensures veterinary communication is largely directive in style; for example veterinarians use predominantly closed questions, rarely employ empathetic statements in relationship building and rarely encourage client participation in appointments (Shaw *et al.*, 2004; Jansen, 2010; McArthur and Fitzgerald, 2013).

Despite the intuitive appeal of this persuasive style based on assumptions of efficiency (Gray and Moffet, 2010), it is more likely to elicit client reactions against a behaviour rather than in favour of it (a phenomenon known as *psychological reactance*; Dillard and Shen, 2005) due to the ambivalence clients commonly experience in the contemplation of change. This directive approach also offers little opportunity to meet the basic psychological needs necessary for inspiring motivation through the internalisation and integration of change messages: that of autonomy (volition over behaviour), relatedness (to experience connection with another) and competence (perceived self-efficacy) (Ryan and Deci, 2000). The predominance of this consultation approach, combined with its

conflict with basic motivational principles, may contribute to why difficulties are witnessed in the implementation of herd health advice.

Awareness of this issue is already taking hold in the veterinary profession, where the Vet Futures project (Vet Futures Project Board, 2015b) established a need for a ‘paradigm shift’ from this ‘*hierarchical model with the vet as the expert imparting instruction, to one centred on partnership with empowered clients and other veterinary-related professionals*’. As explored previously (Chapter One), the MI methodology is a striking partnership for this shift, with the methodology addressing both deficits in communication whilst promoting an underpinning philosophy of collaboration, autonomy support, compassion, acceptance, empathy and evoking (Moyers, 2014). To support the examination of the applicability of MI to the herd health paradigm, it is essential to have a detailed understanding of the language and communication strategies currently used in herd health consultations to support or refute the need for training in tenets of the methodology.

The aim of this research was to identify strategies commonly employed by veterinarians on communication with the aim of behaviour change. For this purpose, role-play interactions were selected to ensure that communication strategies employed were a function of veterinarian approach, not client variation in response; one role-play actress was used for all veterinarian-client interactions. To reflect an appropriate context in the herd health paradigm in which the complexities of communication, client ambivalence and behaviour change are witnessed, the context of advisory services on cattle lameness and mastitis were selected. As highlighted in Chapter 1, these diseases are endemic in the UK dairy industry (Bradley *et al.*, 2007; Barker *et al.*, 2010) and have seen little change in recent decades (Bradley *et al.*, 2007; Whay and Main, 2015). Veterinarians are also known to struggle with communication and proactive advice (Mee, 2007; Jansen *et al.*, 2010), exacerbated by farmer ambivalence stemming from the myriad complexities of herd health management (LeBlanc *et al.*, 2006; Jansen and Lam, 2012). The focus of this study was driven by two research questions: (1) what consultation strategies are prominent in communication with the aim of behaviour change and (2) how do veterinarians attend to client motivation, understanding and engagement with advice when communicating with the aim of behaviour change. Consultations were analysed using a qualitative thematic methodology, to enable a nuanced and in-depth analysis of communication strategies.

3.2 Materials and methods

3.2.1 Ethics statement

This study was reviewed and approved by the University of Bristol Research Ethics Committee (ref 14261), ensuring procedures met ethical guidelines in place for research with human participants. An information sheet was supplied to participants detailing the aims of research prior to data collection, with written consent to take part obtained both before initiating and after completing each role-play interaction. Participants were aware that the study was focused on communication and the uptake of veterinary advice.

3.2.2 Materials and methods

Role-play sessions reflecting consultations on lameness and mastitis were recorded between cattle veterinarians (n=15) recruited from two UK practices located in South West England and an actress experienced in role-play scenarios in both medical and veterinary education. Consultations were held in a closed room at the workplace of each practice with only the veterinarian, actress and this author (Bard) present, and were recorded via an Olympus DS-3500 digital voice recorder. Each practice engaged in one session of data collection, between February and March 2015.

The actress was not provided with a script, or cues of any kind, for the purpose of this interaction. Instead, she was provided with a character and farm profile (Appendix 1) reflecting a ‘typical’ UK situation, indicating mean herd size, productivity, lameness and mastitis levels. Background information on the farmer’s family, perceived barriers to uptake of advice and attitudes/norms/perceived control of lameness and mastitis were also provided. The actress then improvised during each interaction, responding to the communication received in an appropriate and genuine manner given this profile, as a means to generate authentic simulation of the veterinarian-client encounter.

During each ‘consultation’, veterinarians were provided with a short excerpt the disease issue on the farm, an indication of the risk factors that were likely to be involved, and evidence to encourage them to broach a broad topic area of change with the farmer (Appendix 2-3). For lameness, the broad topic was early detection and treatment of lame cows; for mastitis, it was use of the AHDB Dairy Mastitis Control Plan (AHDB Dairy, 2018a). Veterinarians were given their script at the start of their session; data collection commenced when they stated they had had enough time to consider it and had asked any

relevant questions. Veterinarians were limited to fifteen minutes for the interaction and were informed of this; if this time limit approached, the actress would improvise a natural closing of the interaction. The role-play scenario was piloted with a cattle veterinarian from the University of Bristol in advance of data collection; data was not recorded from this pilot for inclusion in the study.

3.2.3 Participants

In summary (Table 3-1), the veterinarians in this study were an average age of 37 years (range 24 to 54) and had been in practice an average of 15 years (range 3 to 29). The majority (13/15) had experience in general/mixed practice. Veterinarians were a convenience sample, recruited by email, telephone or face-to-face interactions from practices known to the author. Not all veterinarians within each practice chose to participate, due to conflict between practice obligations and timing of data collection. For anonymity purposes, the number of participating veterinarians from each practice is not included in this chapter.

Table 3-1. Participant demographics for veterinarians (n=15) in role-play communication interactions

Demographic	Veterinarians
Gender	Male (9)
	Female (6)
Age in years	21-30 (6)
	31-40 (3)
	41-50 (3)
	51-60 (3)
Years in practice as a veterinarian	1-5 (5)
	6-10 (2)
	11-15 (3)
	16-20 (2)
	21 + (3)

3.2.4 Analysis

The 15 role-play interactions were transcribed (*verbatim*) by external transcribers for analysis. Transcripts and audio were initially explored using traditional paper-based coding methods, allowing assessment of the data and the development of initial coding ideas. Data were then imported into the qualitative software NVivo 10 (QSR International, 2018) for thematic analysis (Braun and Clarke, 2006). All textual analysis

was supported by listening to audio data in conjunction with transcript analysis. The entire dataset was coded using inductive themes (i.e. themes determined by the data set and not *a priori*). This resulted in a hierarchical coding structure of three core themes, with various subthemes attributed to each core concept. Once complete, a sub-sample of participants (n=4) were provided with the study results to receive feedback, which supported the authenticity of the work.

3.2.5 Research team

Research was primarily carried out by this author (Bard). To ascertain coding validity, coding was cross-examined by one female supervisor (Roe), an experienced social and cultural geographer.

3.3 Results

Consultations lasted an average of 11.2 minutes (range 7.7 to 14.9). Thematic analysis revealed three prominent themes as summarised in Figure 3-2: Firstly, the *language of the advisory process*, encompassing the effects of verbal framing of both disease and control mechanisms; secondly, the *consultation strategy*, where typical veterinarian approaches to shaping advisory discourse emerged; thirdly, *building the interpersonal relationship*, reflecting interactions underpinning how the veterinarian-farmer relationship was established.

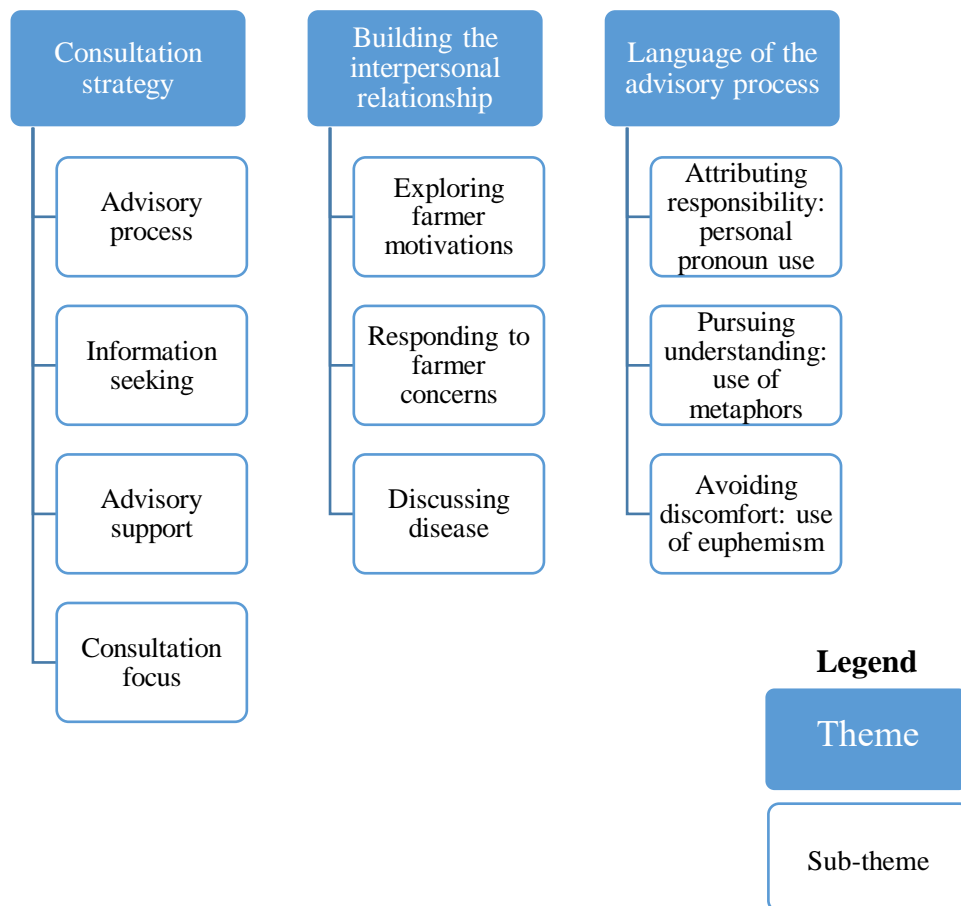


Figure 3-2. Themes and subthemes identified by thematic analysis of role-play (n=15) communication discourse.

3.3.1 Theme 1. Consultation strategy

3.3.1.1 *Advisory process*

In all role-plays, veterinarian dialogue on lameness and mastitis had a common, overarching strategy. This can be presented at its simplest as Figure 3-3. Veterinarians generally utilised open questions at Stage 1, enquiring how the farmer felt about current issues:

RP 11 Veterinarian “Right, so how are things going on the farm?”

In Stage 2, clarification of the issue was sought through further—predominantly closed—questions. In Stage 3, concrete statements were made on what action should be taken by the ‘farmer’, making a plan for moving forward. For example, Figure 3-4 represents questions used in the first 20% of interaction time in Role-Play 5. Questions move from Stages 1-3, first eliciting the problem, then clarifying the issue and finally, moving on to planning. These consultation steps emerged through each interaction, albeit with variation in the time veterinarians allocated to each step and the number of iterations of the whole process. Most frequently, veterinarians focused fleetingly on Stage 1, then moved repeatedly back and forth between Stages 2 and 3, constantly clarifying aspects of the

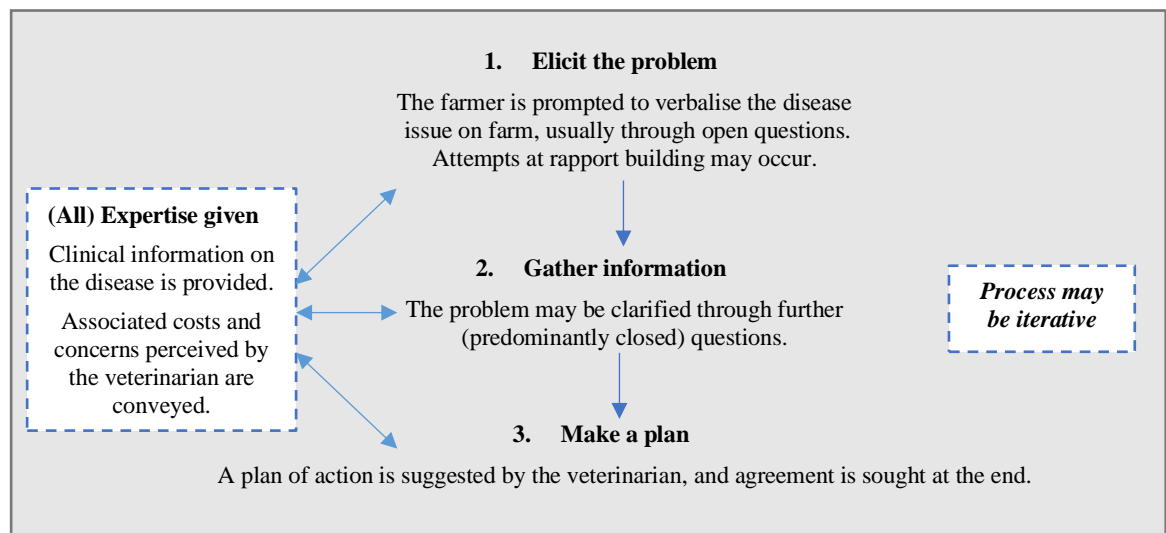


Figure 3-3. Three core consultation stages identified by thematic analysis of role play (n=15) communication discourse

problem and using this to deliver additional information that linked back to an ultimate plan/rationale. In a minority of cases, veterinarians concentrated on eliciting much more information from the ‘farmer’ first, spending a considerable amount of time in Stages 1 and 2 before broaching Stage 3.

Stage 1	1.	Um, so how, how, how are you getting on, how are things on the farm at the moment?
	2.	Yeah. And how, how are the cows doing, how are they milking at the moment?
Stage 2	3.	Yeah, and where’s your cell count sitting at the moment?
	4.	Yeah? More than 200, over the limit?
	5.	And how, what’s your dairy company doing with it, are you getting any penalties or...?
Stage 3	6.	Has John done things with you in the past with your cell counts and mastitis issues?
	7.	You haven’t noticed any sort of dramatic-?
	8.	Yeah? Okay, um, and h- so how, how, do you think going forward we, we’d like to tackle this probably then do you think we should maybe have a-?

Figure 3.4. Veterinarian language illustrating the three consultation stages identified by thematic analysis of role-play (n=15) discourse

Language represents all veterinarian questions in the first 20% of consultation time in RP 5

3.3.1.2 *Information seeking*

When seeking information, veterinarians demonstrated a strong preference for the use of closed questions, with on average four closed questions asked for every one open question. Question types were associated with the consultation stages previously described, with Stage 1 (elicit) relying on open questions such as:

RP 2 Veterinarian “What are your thoughts on the lameness levels at the moment on the farm?”

and Stage 2 (gather information) relying predominantly on closed questions (Figure 3-4).

3.3.1.3 *Advisory support*

In support of their advisory recommendations, veterinarians relied on four core topics:

(1) The evidence base or research associated with advice:

RP 3 Veterinarian “But it’s interesting that there’s some more work and papers of research coming out which suggest that there are slightly different ways of focusing on it”

(2) The experiences of other farmers:

RP 4 Veterinarian “And the other thing we can do is, um, have a chat with some of the other guys in our practice who are currently already using this. And you might well find that, that, er, what they’ve got to say is quite encouraging as well.”

(3) the veterinary profession (themselves, the veterinary practice, and veterinarian construct as a whole):

RP 5

Veterinarian “Yes, well there’s, there’s plenty of people around that we can, you know, that we can use to help us, so I don’t have to do it all on my own and we can, we can use other people if, if necessary.”

Farmer “What other people are you talking about?”

Veterinarian “Other people in the practice.”

and (4) external influencers (such as milk buyers):

RP 14 Veterinarian “Yes, I don’t know who your milk buyer is, but some of the **milk buyers** it is something that they’re wanting to see records for, and it might increase in future that other milk buyers do”

3.3.1.4 Consultation focus

Overall, the ‘focus’ of the consultation was dominated by the veterinarian. All veterinarians created a conversation focused on, and largely limited to, immediate factors surrounding the disease process as identified in the scenario information. That is, little emphasis was placed on asking the ‘farmer’ about wider issues, attitudes or ideas, or allowing ‘farmer’ comments to divert the conversation away from disease management. In questions, this was achieved by a focus on fact-finding questions that supported the veterinarian’s interest, constituting, on average, four out of five queries:

RP 11 Veterinarian “So what’s your bulk milk somatic cell count at the moment?”

RP 5 Veterinarian “So how are the cows doing, how are they milking at the moment?”

Client perspective questions—those aimed at eliciting the thoughts and feelings of the ‘farmer’—on average constituted less than one question in every six:

RP 12 Veterinarian “So were you pleased with how we got on with the routine this morning?”

RP 5 Veterinarian “How do you think going forward we’d like to tackle this probably then...?”

In non-questioning veterinarian speech, veterinarian focus on disease advice was maintained by taking steps to actively direct the conversation towards planning and goal setting. This was achieved by combining a quick succession of ‘disease facts’ (disease risks and costs) with a ‘solution statement’ (how a plan of action would solve these), thereby minimising the opportunity for opposing arguments:

*RP 6 Veterinarian**

*[1] Fact establishment [2] solution statement

“[1] ‘Cause you’ve got to... ‘cause from the point of view of the cow, if you can get her foot lifted and treated as soon as she goes lame, you’ll probably have her back right again in no time and she’ll be much more profitable animal to use. [2] It definitely pays you to treat her straight away; the question probably is whether or not you get somebody in to do it or whether you’re happy to do it yourself.”

This process appeared in two forms: a concise form (as above), where the disease facts and solution statement follow one another in a single statement, or an expanded form, where the veterinarian would guide the ‘farmer’ through disease facts in a series of questions and statements, to conclude with a solution statement(s). The latter process often occurred iteratively throughout consultations (data not shown).

3.3.2 Theme 2. Building the interpersonal relationship

3.3.2.1 *Exploring farmer motivations*

Through all 15 role-play interactions, the ‘farmer’ was not asked directly about her values, goals or motivations. Reference to motivation was only made once, indirectly, following discussion of breeding replacement heifers to improve the herd age distribution:

RP 15 Veterinarian “If it’s something you’ve highlighted already and something that you’re motivated to do then obviously that’ll be something that definitely I can help you work towards. “

Six veterinarians used open-ended questions aimed at eliciting the concerns of the farmer:

RP 12 Veterinarian “Yeah. What’s... what’s... what’s worrying you most at the moment?”

This acted as a functional equivalent: by eliciting the ‘farmer’s’ concerns and opening a discussion on the issues worrying her, the veterinarian was able to open a (possible) route to exploring where or why she might be motivated to make a change. However, for the majority of veterinarians, the ‘farmer’s’ motivation was implicitly assumed, not explicitly sought, throughout interactions. Instead, veterinarians used ‘typical’ motivators to underpin their advice, such as monetary cost, input of time and improvement of yields:

RP 11 Veterinarian “I can put some figures and stuff together for you as well to sort of indicate where your benefits and stuff are going to ... and the-the ... basically the dollar value is the – is the key thing isn’t it?”

3.3.2.2 *Responding to farmer concerns*

When responding to a concern expressed by the farmer, veterinarians typically showed instrumental support—offering tangible help and solutions—by indicating practical support mechanisms:

RP 7

Farmer “Right, yeah I get what you’re saying. I do worry about the money side of things and that’s not your problem, that’s mine.”

Veterinarian “Well there are... occasionally there are funded schemes that come in for these sort of things, which can be really useful and I don’t think there’s one going at the moment, but we recently had this big um SWHLI lameness project where you get... you get funding”

Or offering a ‘solution’ statement which inferred that the concern raised could be dealt with:

RP 13

Farmer “I don’t know if I’ve got the time available to do anything else, because we are so limited. You know, we’ve got two small kids as well”

Veterinarian “It may not mean doing more. It may just mean... it may just mean doing different. So, you know, it may be that we can, for example, alter or suggest alterations to the milking routine which actually don’t take any long... any longer. It may even be quicker, but which would reduce the risk of mastitis spreading within the herd”

However, explicit emotional support—attending to and exploring the client’s perspective or feelings and communicating an understanding thereof—was rarely employed in advisory dialogue. Only two veterinarians used complex reflective statements during their interactions, clarifying and restating what the ‘farmer’ conveyed to encourage further exploration:

RP 12

Farmer “Yeah. But....so it... I’m not saying... I think what you’re saying is very good. I’m just thinking in my head “Oh my God!” [laughs]”

Veterinarian “It’s... it’s one other thing that I’m trying to get you to do on top of all the other things that I’m trying to get you to do with mastitis and that sort of thing as well. So it does become a bit... a bit overwhelming.”

3.3.2.3 *Discussing disease*

One strategy employed was to emphasise the normality of disease on farm:

RP 1 Veterinarian “Well to be honest that’s the, you know, you, you’re not alone, so don’t feel bad about that, there’s plenty of farmers with that.”

RP 3 Veterinarian “Wh- what’s, what’s the main problem out there at the minute? How are you, how are you getting on with the, the usual difficulties in the farming industry?”

3.3.3 Theme 3. Language of the advisory process

3.3.3.1 *Attributing responsibility: personal pronoun use*

Throughout the role-play, veterinarians varied their pronoun use greatly. In gathering information about the farm and generating farmer opinion, use of the second person singular ‘you’ predominated (typical of conversational speech where ‘you’ takes the place of a noun to address an individual):

RP 12 Veterinarian “How often are you scraping?”

This pronoun was also used when referring to current farm ‘problems’ such as high mastitis levels:

RP 2 Veterinarian “Well I think, I think what we need to do to start with is to, is to work out what those cows that are a problem at the moment, just to sort of get a diagnosis on those cows, and then as time goes on, hopefully you will get less and less new cows.”

When discussing plans of action for the herd, or recommendations for changes to practice, veterinarians would employ the inclusive first-person plural ‘we’, indicating themselves and the farmer as the subjects of speech:

RP 1 Veterinarian “So it’s really important to look at the whole picture, and what we’d need to do is- the first thing we did before we did anything is look at your records, and just try and work out exactly where the problem is.”

This was incongruent with farmer language over management actions; all management-related thoughts expressed by the ‘farmer’ in these role-plays were presented in the first person singular ‘I’.

The first-person plural ‘we’ was also utilised as an exclusive term denoting themselves and someone external to the farmer/conversation, such as the veterinary practice:

RP 9 Veterinarian “So there’s....there’s a couple of things that....that we’ve started doing as a....as a practice if you like, cause we’re quite....we’re quite keen on the old...on the old lameness.”

Or sometimes the ‘we’ is more ambiguous, and merely seems to reflect ‘myself and the veterinary profession’:

RP 2 Veterinarian “We now know, and there’s good research to back this up, to show that they’re much more likely to get better quicker and they’re also less likely to go lame again in the future. Okay?”

3.3.3.2 *Pursuing understanding: use of metaphor*

Metaphors were used to simplify understanding of disease processes:

RP 12 Veterinarian “Most of the time it’s um... sole ulcers are like um... a good way to think of them is like, you know, if you um, er, if you cut your... **if you squeezed your finger in a vice** and you’ve got some bleeding under your nail, it’s... **it’s that sort of thing except the vice in this case is cows standing on concrete for too long.**”

To convey an understanding of the challenges farmers encounter in the management of disease:

RP 9 Veterinarian “You’re not really very different to any, you know other farmer in the area, but if you start wherever you are and sort of think ‘oh we could be... have no lame cows at all’, **that’s just a mountain** and it’s... it’s not achievable at the end of the day.”

and to convey the ideal disease management process:

RP 9 Veterinarian “Yeah, yeah and they find that, you know, how these things are all kind of inter-related, the fertility and the lameness and the mastitis and all the rest of it, and **if you can chip away at one corner of that kind of, you know, pyramid**, you can kind of improve...improve the whole thing.”

The strength of the former metaphor for this process was seen when it was mirrored by the ‘farmer’ when querying the benefits of early detection and treatment of lameness:

RP 9 Farmer “...getting on top of anything sooner is better than later than, but how does that affect the yield? Cause you were **talking about this pyramid** and knock on effect and all of that?”

3.3.3.3 *Avoiding discomfort: use of euphemism*

Disagreement aversion was witnessed in the descriptive terminology of lameness, as illustrated by opening statements on the issue. Some veterinarians employed a ‘softer’ approach, not using the word lameness itself, but instead inferring the issue using more informal, euphemistic terms:

RP 9 Veterinarian “I did... did just sort of spot moving through a couple...couple of those girls, sort of taking... **taking their time** to get... get into the race there. Have you had a sort of few girls **lagging behind**, getting into the parlour, that kind of thing?”

In contrast, some brought up the issue more directly under the clinical term:

RP 6 Veterinarian “She’s very **lame** isn’t she? What’s...what’s the matter with her?”

3.4 Discussion

The aim of this research was to identify strategies commonly employed by cattle veterinarians in communication with the aim of behaviour change, driven by two research questions; (1) what consultation strategies are prominent in communication with the aim of behaviour change and (2) how do veterinarians attend to client motivation, understanding and engagement with advice when communicating with the aim of behaviour change. Overall, qualitative analysis of role-play data supports existing quantitative analysis of veterinary communication. The emergent consultation process resonates with the core elements of the Calgary-Cambridge model (Silverman, Kurtz and Draper, 2013) (Figure 3-5) widely adopted in the veterinary realm (Mossop *et al.*, 2015). In small animal consultations, these iterations and structure are also witnessed (Everitt *et al.*, 2013), indicating that the model either reflects something critical about standard veterinary communication processes, or standard communication processes have been influenced by the widespread teaching and distribution of the model. Communication behaviours additionally reflect those witnessed in wider literature (Shaw *et al.*, 2004; Jansen, 2010; McArthur and Fitzgerald, 2013); veterinarians dominated the agenda, typically placed minimal value on eliciting the client’s own motivations and ideas within a consultation, kept strictly to the topic of disease management at the expense of rapport building and prioritised instrumental support strategies.

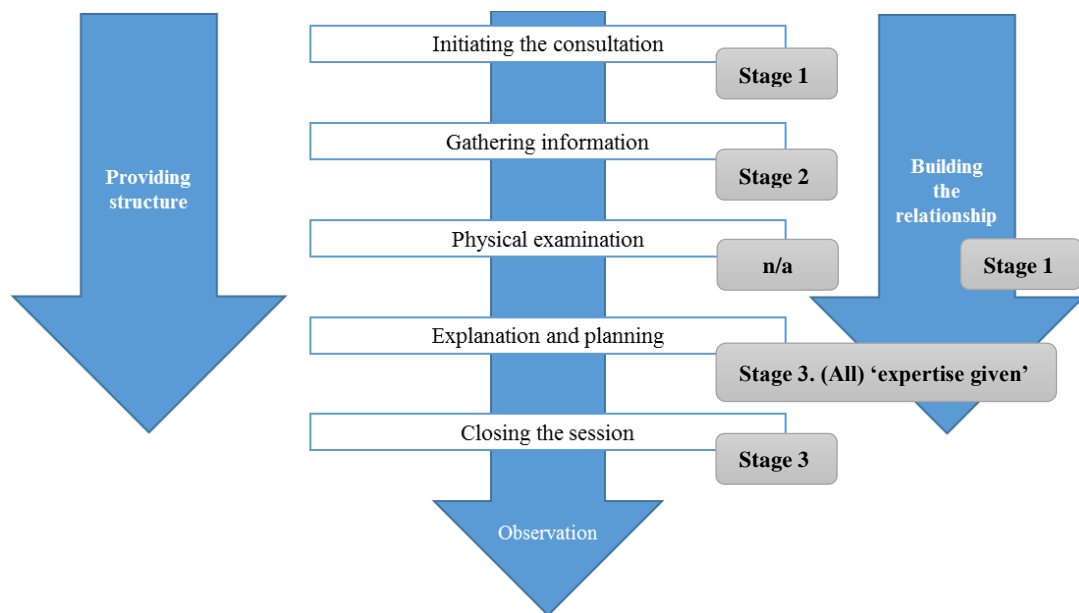


Figure 3-5. Congruence of consultation stages identified by thematic analysis of role-play (n=15) discourse and Calgary-Cambridge model. Adapted from Radford and colleagues (2006) for illustrative purposes.

It is possible to hypothesise that the cause of these behaviours is rooted in the methodology. A limitation of this study is that the role-plays were artificial; veterinarians were time limited (<15 minutes), did not have an established relationship with the client and were ‘performing’ a role. However, these features are representative of wider research reflecting ‘naturally occurring’ consultations. Mean role-play consultation length (11.2 minutes) is certainly comparable to small animal practice (Shaw *et al.*, 2006; Everitt *et al.*, 2013; Robinson *et al.*, 2014), whilst advisory interactions on-farm are often restricted to fit around other practical tasks, despite longer contact time with clients (for example, interspersing cattle fertility checks). In naturally occurring consultation data, where relationships are established and no ‘performance’ is occurring, both directive behaviours (Shaw *et al.*, 2004; Jansen, 2010; McArthur and Fitzgerald, 2013) and a dearth of emotional support (Shaw *et al.*, 2004; McArthur and Fitzgerald, 2013) are still witnessed. Whilst a limitation of the study, the methodology alone can therefore not account for the strategies that emerged. We hypothesise that these strategies were witnessed as a result of the predominant relational paradigm of paternalism recognised in veterinary literature (Shaw *et al.*, 2006), as our data reflect characteristics implicit in this style: the professional sets the consultation agenda, communicates in a directive style and contributes most of the talking, leaving the client in a passive role.

Indeed, the language of attributing responsibility suggests that this paternalistic approach may be heavily integrated into the veterinary identity, to the extent of shaping pronoun use when discussing disease management processes. Veterinarians relied on the collaborative pronoun ‘we’ for discussing management actions on farm, yet the ambiguity of this term undermined any assumptions of collaborative intent; it is impossible to determine whether veterinarians were or were not fostering partnership, or whether the ‘farmer’ did or did not perceive this. What is measurable in these data is the incongruence of this pronoun with all ‘farmer’ language on the same topic of management; all management-related thoughts expressed by the ‘farmer’ were presented in the first person singular ‘I’, suggesting these were actions she alone—not the veterinarian—would have to take. This pronoun incongruence and advisor reliance on ‘we’ to initiate action statements is also witnessed in doctor-patient exchanges. It is speculated to reflect a situation where doctors retain the right to direct the agenda; the term ‘we’ may act as a vehicle for directive discourse by which topics are nominated for discussion. The incongruence of doctor-client pronoun use infers that doctors are viewed as conduits or

coordinators of, but not participants in, care (Skelton, Wearn and Hobbs, 2002). Our veterinarian-farmer incongruence may similarly indicate this nuance within the consultation.

These paternalistic strategies are likely to impact on client motivation to engage in behaviour change. A strictly veterinarian directed consultation focus reduced client choice and opportunity for self-direction within the consultation, thwarting a sense of autonomy (Ryan and Deci, 2000). The dominance of instrumental support and deficit in explicit emotional support created an interaction where the client is likely to feel less empathised with (Semmer *et al.*, 2008), impeding relatedness. Minimal opportunities for the client to vocalise and explore their ability, intention and rationale for change(s) diminished a sense of self-efficacy in the planning process. Where SDT establishes these factors are critical to inspire motivation and the internalisation of behaviour (Ryan and Deci, 2000) the conflict between this paternalistic style and psychological attributes is significant. This conflict may underpin issues with adherence to recommendations and behaviour change in the herd health paradigm that underpin the lack of change on-farm witnessed in this advisory context.

However, despite this paternalistic approach, veterinarians were able to concurrently employ strategies in these consultations that enhance a sense of relatedness. Euphemism was used to avoid discomfort over recommendations and discussions of disease, for example substituting the term ‘lameness’ with ‘lagging behind’. By using euphemism in social interaction, communicators either seek to minimise potential discomfort in an addressee (Pan, 2013) or, more frequently, use this language as self-preservation to appear more sympathetic or considerate (McGlone and Batchelor, 2003). Metaphor use also supported the building of rapport by generating a shared understanding of advisory recommendations; veterinarians shaped and strengthened farmer perception of advice by evoking a host of multiple meanings (Lupton, 2012). The dominance of instrumental support (tangible help/solutions) may also reflect an attempt by veterinarians to display empathy, rather than a lack thereof; veterinarians may be perceiving the farmer’s concern as a negative emotional state and trying to alleviate it by providing a ‘role appropriate’ response (‘fixing’ the problem, as they are paid to do). Previous literature suggests that this behaviour readily occurs in professional interactions, where advisor support strategies are shaped by their focus on alleviating a problem (Semmer *et al.*, 2008). If done skilfully, this instrumental verbal behaviour is likely to carry symbolic emotional

meaning for a receiver (Semmer *et al.*, 2008), positively influencing relatedness. It is, of course, impossible to determine the veterinarian's intention, or whether the 'farmer' attributed emotional significance to this strategy. However, previous literature suggest the 'farmer' is less likely to feel emotionally engaged with when instrumental support is used, compared to when she receives overt emotional support (Semmer *et al.*, 2008).

Veterinarians also show a complex understanding of motivational factors underpinning farmer decision making through varied advisory support strategies, despite the absence of overt evocation or consideration of the personal opinion of the 'farmer'. Citing research may reflect the move towards evidence-based veterinary medicine (EBVM), and the responsibility to '*ground ... decisions on sound, objective and up-to-date evidence, when available*' (Jorge and Pfeiffer, 2013). When referring to other farmers, veterinarians display an intuitive understanding of the psychological components of change, recognising that personal perceptions of other people's behaviour (subjective norms) potentially exert influence over the intention to change one's own behaviour (Ajzen, 1991: Chapter One). When citing the support of the veterinary profession, veterinarians are conveying a notion of their professional status and authority as a part of this unit, cultivating the interpersonal trust that is critical to the uptake of advice (Maille and Hoffmann, 2013). Finally, aligning recommendations with future economic incentives (milk price) reflects awareness of economic issues facing the dairy industry that may be exerting great pressure on farmers; market volatility is certainly of great concern (AHDB Dairy, 2018b). Overall, these strategies tell us that the typical veterinarian is balancing a complex set of approaches in what is easily reduced to 'directive advice'. Their awareness of farmer psychology, changes within the profession and challenges to the farmer are all captured within their approach; what is missing is attending to the client's perspective to actively tailor this communication to the individual, rather than responding with generalities.

These qualitative data therefore provide an optimistic view of the future of the veterinary consultation. Whilst they confirm communication deficits in empathy, collaboration and motivation as recognised in existing literature (Shaw *et al.*, 2004; McArthur and Fitzgerald, 2013), the results presented here suggest that veterinarians may already be motivated to create an environment that meets these needs. Unfortunately, the paternalistic role of the veterinarian—an expert, paid to provide a service of advice and solutions—may shape these responses into the directive language and structure with

which they are delivered. As discussed earlier, this style creates psychological reactance (Dillard and Shen, 2005), so, ironically, the very service this professional style aims to deliver is directly counteracted by the communication strategies it produces.

In light of these data, the paradigm shift towards mutuality in the future of herd health advisory services becomes more complex. To promote client motivation and behaviour change within veterinary consultations, is it simply enough to ask for more partnership when the subtle effects of the existing paternalistic paradigm are likely to undermine it? This conflict is well illustrated via the VetFutures report (Vet Futures Project Board, 2015) which states that *‘by working **in partnership** with clients, vets are **better positioned to convince them** of the value of preventive services’*. The conflict between mutuality and paternalism here is clear: to ‘convince’ is the essence of paternalism, suggesting the need to bring another to one’s already set point of view, to direct their opinions and choices. As a result, the alluded partnership is merely presented as a vehicle to better persuade in a directive style, rather than an approach in its own right.

In light of this, the applicability of MI in this context is a promising opportunity. The use of MI would necessitate a shift from the typical consultation style manifested in communication on behaviour change- that akin to the Calgary-Cambridge model, with suggested limitations in the herd health advisory paradigm (Kleen, Atkinson and Noordhuizen, 2011)- to one focused on evidence-based strategies in engaging clients in the decision to make complex change (Miller and Rose, 2009; Miller and Moyers, 2017). MI could also act to stimulate a genuine paradigm shift in advisory roles, as it is not only defined by a set of verbal skills cultivating empathy, collaboration and support of patient autonomy, but by an underpinning philosophy of compassion, acceptance, partnership and evoking (eliciting client ideas, rather than imposing) that act as a mindset to guide practice (Miller and Rollnick, 2012). Finally, familiarity with the MI methodology could offer novel insights to veterinarians in practice into how communication and engagement with important motivational factors could best be achieved, promoting farmer engagement in behaviour change for the benefit of herd health.

3.5 Future work

This Chapter explores the complex nature of veterinary advice for farmer behaviour change, using role-play as a means to evaluate current communication strategies. This methodology was chosen to control for variation in ‘client’ response during the interactions, given that role-play provides *‘a variety of naturally occurring data and is therefore worthy of study’* (Seale *et al.*, 2007). The potential for role-play to generate ‘authentic simulations’, however, is a complex issue (Stokoe, 2011) and may be considered a limitation of this research.

Future work could address this matter with the analysis of naturally occurring data (i.e. routine veterinarian-farmer interactions of this nature) to investigate if the same themes emerge given varied herd health topics and the complexity of differing clients and environments. The collection and analysis of naturally occurring data would also ensure that the underlying complexity within ‘real world’ encounters is represented; the human-animal relationship. The socially constructed categories of ‘companion’ and ‘livestock’ animals engender differing human perceptions and practices (Holloway, 2001) affecting both the owner-animal and veterinarian-animal relationship. These categories also affect a veterinarians’ perception of their client’s relationship to their animal (and thus perceived motivation to attend to health and welfare), potentially influencing advisory style. However, given that trends in these data mirror those witnessed in wider veterinary communication research (such as veterinarian dominance in agenda setting, minimal solicitation of client opinion and lack of explicit emotional support; Shaw *et al.*, 2004; Jansen, 2010; McArthur and Fitzgerald, 2013), the data presented here already appear to represent something meaningful about veterinary communication in the pursuit of farmer behaviour change.

Chapter Four

To change or not to change? Factors influencing farmers’
enactment of veterinary advice on UK dairy farms

*“Where did all the sages get the idea that a man’s desires
must be normal and virtuous?*

*Why did they imagine that he must inevitably will
what is reasonable and profitable?*

*What a man needs simply and solely is independent volition,
whatever that independence may cost and wherever it may lead”*

Fyodor Dostoyevsky

Abstract

Achieving herd health and welfare improvement increasingly relies on veterinarians to train and advise farmers, placing veterinary communication at the heart of knowledge exchange. Veterinarians recognise their influence and the need to be proactive advisors but struggle with acting upon this awareness in daily practice, reporting a need to enhance their advisory approach to influence farmer behaviour. Understanding the interaction between communication, advice and on-farm behaviour change is therefore critical. This chapter uses a qualitative approach to examine factors that influence farmers’ enactment of veterinary advice on the UK dairy farm to conceptualise how - and under what circumstances - veterinary communication has the potential to support and inspire farmer behaviour change.

Fourteen UK dairy farms were recruited to take part in a qualitative study involving research observation of a ‘typical’ advisory consultation between veterinarian and farmer (n=14) followed by an in-depth interview with the farmer(s) and their respective veterinarian. Interview data were organised using a template coding method and analysed thematically. Data suggest three core elements underpin the enactment of veterinary advice on the UK dairy farm: farmer belief in veterinarian virtue, the perception of a shared understanding between veterinarian and farmer and the manifestation of advisory meaning at a local (farmer) level. The enactment of veterinary advice can be conceptualised as the synergy of these three themes, within which desirable veterinary communication acts both as a necessary foundation and perceptual catalyst. Given the relational focus and Spirit of the MI methodology (Chapter One), these themes suggest MI may facilitate an approach to herd health advice that encourages advisory recommendations to manifest meaning for farm clients.

4.1 Introduction

Achieving herd health and welfare improvement increasingly relies on veterinarians to train and advise farmers (DEFRA, 2004; FAWC, 2011), placing veterinary communication and advisory services at the forefront of herd health management. Veterinarians recognise their influence and the need to be proactive advisors but struggle with acting upon this awareness in daily practice (da Silva *et al.*, 2006; Mee, 2007). In recent research, Ruston and colleagues (2016) identified that this struggle is so pervasive that veterinarians report challenges in influencing behaviour change as fundamentally undermining the preventative advisory role itself. As one ‘male partner’ in Ruston and colleague’s (2016) veterinarian interview cohort indicated, *‘I think the battle ground is probably not on the science, the battle ground is on behaviour change and all this type of thing. So it’s not knowing more stuff that we need, we need to basically to be able to implement it better’*.

In the veterinary sciences, research efforts aiming to characterise the intricacies of farmer behaviour have been dominated by the adoption of theoretical frameworks from psychological sciences, most notably the Theory of Planned Behaviour and the Health Belief Model (Ritter *et al.*, 2017). This has generated a plethora of studies in the ‘behavioural approach’ seeking to understand individual decision maker behaviour, focusing on psychological constructs such as goals, attitudes and values and employing largely quantitative methodologies (Burton, 2004). However, qualitative research seeking to understand the nuance of the herd health advisory paradigm - such as how and why it becomes possible for a veterinarian to motivate a farmer on a particular topic, how the herd health interaction is expected to function by both veterinarians and farmers and why advisory recommendations are enacted in farmer behaviour – are, to this author’s knowledge, lacking.

Recent publications placing increased emphasis on the sociological, rather than behavioural, perspectives have offered some insight into the herd health advisory paradigm, indicating various ‘human factors’ implicit in the enactment of advice. For example, veterinarians report farmers’ trust in veterinary knowledge and communication skills as important for implementation (Jansen, 2010), whilst the perceived role of the veterinarian, the relationship between veterinarian and farmer and the trust invested in this relationship combine to effect adoption of advice (Richens *et al.*, 2016). However,

existing qualitative research tends to be driven by a specific disease or intervention focus, such as mastitis (Jansen, 2010) or vaccination (Richens *et al.*, 2016), with no qualitative literature examining the veterinary advisory paradigm in and of itself. This deficit in understanding means that there is little insight for advisors to support and inform their professional services to encourage behaviour change, nor theoretical basis for educators and trainers to tailor education packages to the specific needs and intricacies of this context. To assess the applicability of MI as an intervention methodology to enhance the herd health advisory paradigm, this knowledge and nuanced understanding of context is critical.

The aim of this study was to address this knowledge gap and investigate veterinarian and farmer perceptions relating to the enactment of veterinary advice. Fourteen UK dairy farms took part in a qualitative study, involving research observation of a ‘typical’ advisory consultation between veterinarian and farmer (n=14) followed by an in-depth interview with the farmer(s) and their respective veterinarian. Interview data were organised using a template coding method and analysed thematically (Braun and Clarke, 2006) to explore why, and under what circumstances, advisory communication leads to the enactment of change for dairy farmers in the UK.

4.2 Materials and Methods

4.2.1 Participant recruitment and sample

Participating farmers were recruited through a multinational producer of dairy products. A regional operator approached all farms in a regional farmer group (n=33) with information on the research study, from which a subset of farms (n=22) agreed to be contacted for recruitment purposes. Following contact by the primary researcher (Bard), a final study sample of fourteen farms (n=14) resulted where both the farmer(s) and veterinarian (n=11) were able to participate (some veterinarians were responsible for >1 farm in the sample). During the research process (Figure 4-1) a selection of farms opted to have multiple farm members attend the interview, meaning 19 farmers were interviewed across 14 farms. Additionally, one veterinarian became unavailable for interview after the on-farm visit for personal reasons, resulting in 10 veterinarian interviews.

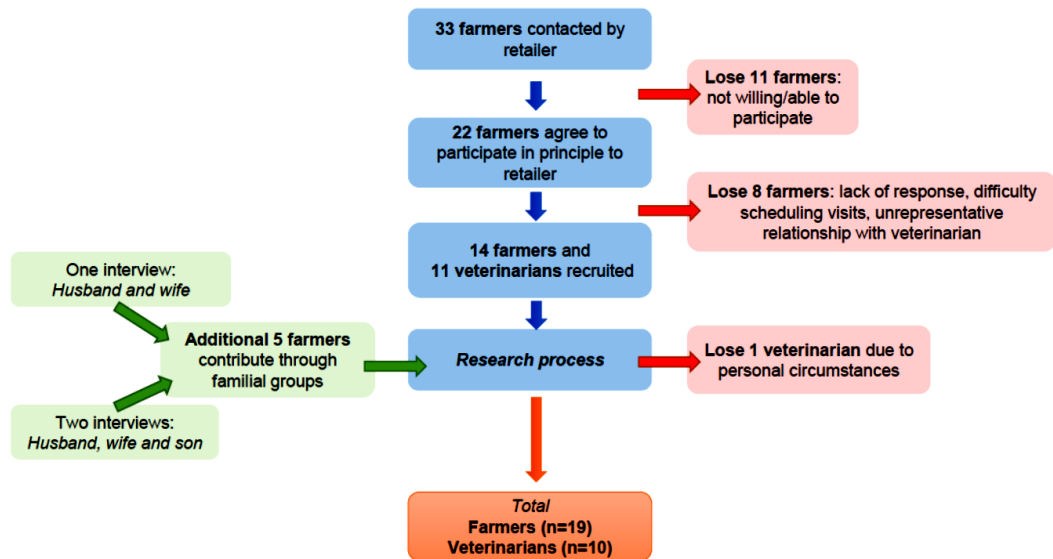


Figure 4-1. Flow diagram of recruitment process for total farmers (n=19) and veterinarians (n=10) across 14 farms

4.2.2 Participant demographics

Farmers in this study (n=19) were an average age of 42 years old (range 18 to 59) and had been in dairy production for an average of 23 years (range 3 to 45). Farms ranged from family-run herds (60 head cattle) to commercial units (470 head cattle) and three of the 19 farmers were female. Veterinarians in this study were an average age of 44 years old (range 25 to 60) and had been in farm practice an average of 19 years (range 1 to 35). Two of the 10 veterinarians were female.

4.2.3 Procedure and data collection

The research methodology for each farm involved three distinct stages: (i) research observation of a ‘typical’ advisory consultation between veterinarian and farmer(s) (n=14) followed by (ii) an in-depth interview with the farmer(s) and an in-depth interview with their respective veterinarian.

(i) Each participating farm was visited by this author (Bard) during a routine veterinary consultation on cattle fertility involving the farmer(s) and their named veterinarian. This visit was an opportunity to observe and digitally record a ‘typical’ consultation between the veterinarian and farmer and gain an understanding of the complexities and contributing factors that shaped this interaction, for example through observing the farm (layout, structure, handling systems, condition), the herd (herd size, behaviour,

condition), the farm staff (size, relationships to farmer, involvement, interactions) and the veterinarian-farmer interaction (familiarity, topics discussed, perceived habits or routines). Observations lasted a mean of 75 mins (range 43 to 142) and provided this author (Bard) with insight to inform and guide the interview process.

(ii) Each party took part in an in-depth interview, allowing the researcher to explore and uncover the complexity of the interviewee's experiences within a certain field, rather than seeking to quantify opinions within a select group or generate a representative sample of those opinions (Vaarst *et al.*, 2007). The interviews were iterative in nature; specifically, this author (Bard) was concurrently collecting data in new interviews while analysing data from previous interviews, which resulted in the foci of the interview schedules altering as the researcher's experience and insight into the topic area deepened (DiCicco-Bloom and Crabtree 2006). This methodology encouraged departure from the pilot schedule questions and themes (Appendices 4-5) in order to more accurately follow the interviewees' interest, knowledge and insights (as per DiCicco-Bloom and Crabtree 2006). For example, initial pilot questions utilised two endemic diseases (lameness and mastitis) as subjects through which to explore the enactment of veterinary advice on farm, given their resonance as topics of behaviour change in the herd health advisory paradigm (Chapter Three). However, through the interview process, it quickly became apparent to the interviewer (Bard) that inviting interviewees to recount experiences on the enactment of advice on (i) change topics of their choice and/or (ii) change topics observed during the farm visit provided more rigorous and detailed personal reconstructions of events and experiences, enhancing the experiential interview accounts. This change, along with other iterative schedule adjustments that were made as the interview experiences progressed, facilitated full exploration of relevant themes to ensure data saturation was reached.

All interviews were conducted by this author (Bard) and recorded by dictaphone. Each semi-structured interview lasted a mean of 54 minutes (range 15-105) with the focus on eliciting decisions, processes and perceptions relating to farmer behaviour change in the context of advisory services. Aside from the pilot, for the farmer these interviews occurred on-site after the observed consultation. For the veterinarian, these occurred at the practice within two weeks of the visit but were usually completed the same day.

The pilot of this method was carried out on two farms and involved completing both interviews on farm following the herd health consultation. This approach was altered

thereafter to secure separate interview locations for the farmer(s) and veterinarian, to both remove any time pressure on the veterinarians and to create more perceived privacy for each interviewee’s experience. Of these two pilot farms, one set of interviews (veterinarian/farmer) were included in the analysis in their original form, whilst the second pilot farm participants (farmer and veterinarian) agreed to be re-interviewed three months following the initial farm visit to give more time to the in-depth interview process (this author (Bard) re-visited the audio recording and notes of the farm visit in advance of these interviews).

An information sheet was supplied to participants detailing the aims of research prior to data collection, with written consent to take part obtained. This study was reviewed and approved by the University of Bristol Research Ethics Committee (ref 14261), ensuring procedures met ethical guidelines in place for research with human participants.

4.2.4 Interview analysis

Twenty-four interviews were transcribed (*intelligent verbatim*) by external transcribers for analysis. Transcripts and audio of a subset (25%) of the interviews were initially explored using traditional paper-based coding methods, allowing assessment of the data and the development of initial coding ideas. Informed by this exploration, data were imported into the qualitative software NVivo 10 (QSR International, 2018) and organised/coded using the template methodology described by King (2004) to enable the comparison of farmer and veterinarian perspectives within this context. This coding process was inductive, with the template coding and structure determined and shaped by the data throughout the coding process. Once the full data set was coded, matrices were exported and analysed thematically (Braun and Clarke, 2006), seeking to shed light on why, and under what circumstances, advisory communication leads to the enactment of change for dairy farmers in the UK.

4.2.5 Research team

Analysis was carried out by this author (Bard). Coding was cross-examined by one female supervisor (Roe), an experienced social and cultural geographer.

4.3 Results and discussion

Veterinarians and farmers spoke about three core factors that influenced whether advice would be enacted on-farm: the belief in the virtue(s) in the veterinarian that lay the foundation for relational trust, the foundation of a shared understanding between veterinarian and farmer and the context-bound capacity for advice to manifest meaning.

4.3.1 The belief in virtue

Farmer 12 “Oh god yes, yes, 100%. It’s got to be. It takes a long time to build that trust up and it’s only done over time from seeing what animals recover from their examination, from their points of view what’s wrong and yeah there has to be a lot of trust there which is why I find it strange when people jump from one veterinary practice to the next to the next.”

Throughout these interviews, veterinarians and farmers spoke at length about a critical bond of trust between them; their professional relationship was predicated upon this attribute. This relational bond represents a three stage process (Dietz and Den Hartog, 2006): (i) **a belief**: the farmer judging the veterinarian as trustworthy, based on a perception of veterinarian ability, benevolence, integrity and predictability (Figure 4-2); (ii) **a decision**: given this judgement, the farmer decides to trust the veterinarian, a behaviour representing ‘a willingness to accept vulnerability and risk’ based on expectations of the veterinarian’s behaviour (Borum, 2010); and (iii) **an action**: the farmer voluntarily enacts attitudes and behaviours that expose her/him to vulnerability and risk (e.g. the attitude that the practice is fair with their prices, of the behaviour of enacting a treatment regime). The importance of establishing this relational bond was witnessed in narratives on the working relationship, where virtues that secure trustworthiness (Figure 4-2) manifest in stories of what defines the ideal farm veterinary experience.

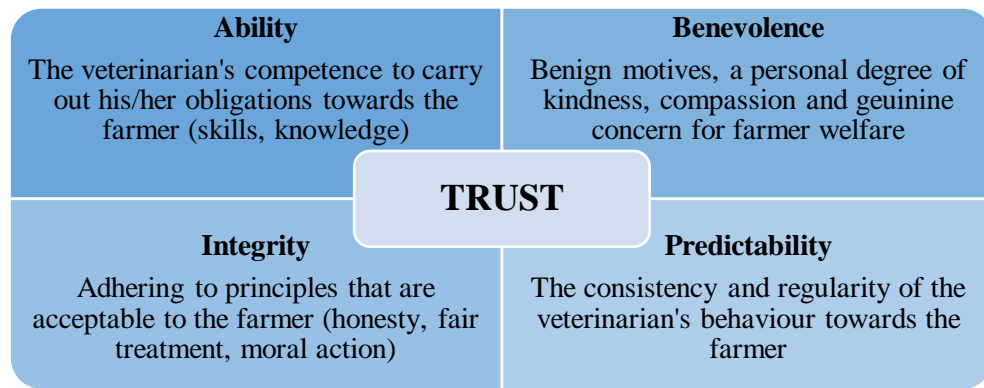


Figure 4-2. The four virtues needed for assessment of veterinarian trustworthiness (Dietz and Den Hartog, 2006)

4.3.1.1 *Ability*

The perceived ability of the veterinarian was a critical foundation of the interaction, with both parties expressing a perceived correlation between the veterinarians ‘overall experience’ and this virtue. This ‘overall experience’ captured traits of both scientific/professional knowledge (age, length of time in practice, specialism, mixed/specialist practice) and local knowledge (personal background in or out of farming, degree of personal and professional involvement in dairy context) suggesting that whilst ability in this context is founded upon scientific prowess, the virtue also encompasses employing this knowledge ‘appropriately’ given contextual understanding. The value of ability was such that farmers would actively engage with advice when this virtue was perceived in their veterinarian, as perceived ability ensured accurate, reliable and relevant herd health recommendations:

Farmer 3 “Yes, we are lucky that [our vet] is the best vet that is up there. He is a partner in the firm and he is the best vet. And then you listen to what he says, not that you shouldn’t listen to the younger ones. But you know [our vet] has got experience and he does talks all over the world and he is a pretty knowledgeable chap, so what he says you sort of listen to... His quality is his knowledge... and when he talks you sort of listen.”

Veterinarians showed an awareness of this through their cultivation of ability ‘signals’, such as being a specialist in a particular area (for example, having publications on a particular topic area), seeking further qualifications in areas of veterinary science (for

example, through the Royal College of Veterinary Surgeons Certificate(s) in Advanced Veterinary Practice (RCVS, 2018b) or Advanced Practitioner Status (RCVS, 2018c) or emphasising the longevity and closeness between themselves and their farmers and having a ‘shared understanding’ of the local world (see 3.2). This combination of scientific knowledge with local understanding is likely critical to the professional relationship; Fisher’s (2013) exploration of farmer engagement with governmental advice illustrates that farmers’ perception of ‘sufficient’ knowledge for advisory competency requires both ‘grass roots’ insight as well as a scientific evidence base, without which trust is thwarted.

4.3.1.2 *Benevolence*

The perception of benevolence threaded through narratives on the working relationship, where farmers expressed a desire for the veterinarian to deliver a service on compassionate grounds - one that was not strictly constrained by veterinary protocol and did not exist only to create veterinary profit, but that respected and had compassion for the needs and goals of the farmer(s). Veterinarians, in turn, were acutely aware of this benevolent side to veterinary services, reporting at times altering or adjusting service expectations and delivery based on the individual constraints and desires of the farmer they were interacting with. For example, veterinarians reported avoiding situations where they would have to deliver criticism to their primary farm clients, choosing instead to bring in another individual at the practice rather than thwart their benevolent perception:

Vet 9 “If I told them that they’re doing rubbish work at certain things they might take offence and that would impact on the relationship... It might be better coming from a third person not interfering with the relationship that we have and somebody else will bring the bad news. You need to do this, you need to do that, you have been underfeeding... But yes we’ve got different people running different projects and sometimes it is really nice to get somebody else on the farm to tell them the bad things and you are still on good terms with them and you can then reemphasise.”

Sometimes this benevolence could extend beyond intuitive constraints of professional obligation, hinting at the strength these relationships could manifest:

Vet 1: “I’ve known [farmer] pretty much all his working life. Since he was a teenager, but he is hopelessly disorganised and got himself in a real financial mess. We’ve been good to him. We could have made him bankrupt. He still owes us quite a considerable amount of money but we’re now on a payment scheme and he’s sticking to it and I’ve had to go against quite a lot of my partners who wanted the money, I mean a substantial sum; probably more than you and I earn.”

The significance of benevolence is most notably captured in stories where this perception of goodwill was thwarted in some way, for example; one farmer discussed their experience during the foot and mouth crisis, when their veterinarian prioritised a ‘moral stance’ of enforcing movement rules ‘by the book’ rather than acting in a way that acknowledged the emotional wellbeing of the farmer. This prioritisation was sufficiently distressing and in contrast to their expectations of benevolence for the farming family to break a life-long relationship with their veterinary practice as a result;

Farmer 2 “It was foot and mouth. Basically we didn’t have enough room to keep them [the calves] and they would allow you to cull them and you would get paid for culling them on the basis that you didn’t have space and you couldn’t move them. Because we needed to move them [to slaughter] from here, we needed to move them from fields we’ve got several miles away. And [the vet] said, I don’t think it’s a reason to sign [the movement paperwork] and he wouldn’t sign...all our calves were having to be shot [as a result]. Literally I can remember them loading up in the back of a lorry and shooting them, it was awful.

I think at that point they needed to have a lot of sympathy with farmers that were losing money... and just trying to recoup some of those losses in some way and I think that perhaps was the issue, is that he didn’t have that empathy... We had the opportunity to go somewhere else and we went somewhere else [changed practice].”

This is an emotionally charged example - with an outcome that matched this intensity - yet qualms over veterinary benevolence in day to day activities were regarded as having the potential to influence perceptions of veterinary advice and stall behavioural

enactment. Similarly, in their exploration of farmer interpretations of veterinary advisors, Duval and colleagues (2017) identified that if farmers have cause to question veterinary intentions (such as questioning their independence towards pharmaceutical industries) this can lead to lack of trust in advisory recommendations given.

4.3.1.3 *Integrity*

The need for integrity underpinned all aspects of the advisory interaction, where farmers’ perceptions of this virtue instilled confidence in veterinary services. For example, farmers desired a sense that they received fair costings of treatment(s), the best advisory recommendations possible (in their unique circumstance), transparency on any mistakes made and open acknowledgement of risks and ‘dead end’ treatments:

Farmer 3 "You need someone honest as well, if someone says the cow is knackered, she is knackered, there is no point in trying. Whereas someone would say treat for this, treat for that. Sooner have someone say she is knackered, it is not worth trying, rather than spending money and having to shoot her later."

Veterinarians recognised the need for honesty to underpin their services, with trust in their veterinary judgement sometimes stemming as much from honesty over things that they ‘can’t do’ as much as ability in areas they have mastered:

Vet 6 "Know what you can do, know what you can't do, be honest and say 'this is my first time doing this', or 'I've done so many of these'.... if you do the things you say you can do very well and get someone else to help with the things you can't do, that instils a lot of confidence in them. Then they know the things you're willing to say can do, you can do. They'll trust your judgement basically."

This narrative of integrity is one that echoes the embodied virtues of the veterinary profession at large, of sufficient strength for it to be enshrined within the RCVS professional oath ‘*I promise and solemnly declare that I will pursue the work of my profession with integrity*’ (RCVS, 2018a) and drive ethical decision making in response to complex cases (Rees, 2015). In an exploration of connectivities among rural elders in England and Wales, Curry and Fisher (2012) suggest that this ‘human characteristic’ was felt to be stronger in the building of trust between elders and their communities than the

knowledge base of the person to be trusted. It is as if integrity acts as the lens through which ability is judged, without which faith in reported ability is meaningless. Indeed, as one farmer illustrates, this sense of honesty can even imbue veterinary failure with minimal meaning: *‘as long as they’re honest I wouldn’t worry, at the end of the day you’re never going to right all the time’*.

4.3.1.4 *Predictability*

Finally, veterinarian predictability encouraged a sense of security and stability in the advisory service. This sense of predictability arose through various factors, such as farmers having an individual they thought of as ‘their vet’ at a particular practice who was primarily responsible for their routine visits, having a veterinarian who could be relied upon to support them in emergencies (access to the veterinarian’s mobile phone number was often mentioned as indicative of this support) and could be relied upon to be connected with them over the long term. One farmer’s ‘twitchiness’ at having to change veterinarians reflects this need for stability and predictability:

Farmer 10 “We’ve been with [Vet x] a long, long time now...oh 10 or 15 years I suppose... yes we know him very well. [Vet x]’s one of the partners, we had other vets before him but [Vet x] as you’ve probably guessed is very busy, and we struggled to get him do the routines ...we had some other vets for a while in there – they weren’t partners, they were just employed, and they kept leaving...so I asked the question politely, just said ‘is there any chance of having [Vet x] do my routines?’ ... I was getting a bit twitchy about it if I’m honest, at the time... this is not good, you just get into a routine with one vet, how they work and they know how I work and they announce they’re leaving and then you have to get know a whole...so it is quite nice to have that stability with [Vet x] ...I’ve got his mobile phone number if I need to ask him any questions, he’s more than happy for us to give him a bell or a text message and he’ll get back to us.”

It is perhaps modelling this predictability that provides recent veterinary graduates their first step up onto the platform of trusting virtues. Enticott (2012) noted that for new graduates to attract routine work on farm, they must be perceived as trustworthy and competent, which can be inferred through their ability to carry out the tuberculosis testing

protocol reliably and according to existing expectations of the farmer. This may be because this enactment of protocol is sufficiently familiar to the farmer that a new graduate can express a core trust virtue (predictability) in their adherence to the protocol’s expected process. However, in the same instance, if new graduates do not follow the protocol of their practice forbears (if they have learned a different approach, or perhaps are much slower due to newness at the task) this could thwart the development of trust at an early stage.

4.3.1.5 *Virtues and their advisory impact*

The culmination of the virtues underpinning trustworthiness is well illustrated in this veterinarian’s statement on the working relationship:

Vet 9 “They trust you and they believe in you. And you are entrusted with something, as I said quite sacred to my mind because you mustn’t bluff, you should try to do your best at all times. Even if you are tired and completely broken and you have had three horrible nights of cold. If he then needs you... you can say alright I will jump in the car and then I will go today.”

In this one statement the veterinarian has echoed the need for ability (*‘doing your best at all times’*), integrity (*‘don’t bluff’*), predictability (*‘even if you are tired and broken... you jump in the car’*) and benevolence, where the overall description intuitively conveys an approach embedded in kindness and concern.

These components of trustworthiness set the virtuous stage for the advisory paradigm and give the information conveyed by the veterinarian meaning. For a trustworthy veterinarian, the farmer can reasonably assume that the advisory communication comes from someone with appropriate knowledge, skill and confidence to address the problem (ability), who will give care and consideration for the farmer’s needs in deciding and advising on appropriate action (benevolence), is honest about the contextual benefits, drawbacks and costs of this (or other) management choices (integrity) and whose continued support and insight can be relied upon when enacting the advice (predictability). If the legitimacy of one or more components is questionable, the decision to trust and use this trust to guide action would be expected to flounder (Dietz and Den Hartog, 2006); that is, a farmer’s proclivity to accept vulnerability and risk from the veterinarian’s advice weakens and, with it, the resolve to enact advice:

Farmer 1 “Once you lost trust in a vet it’s difficult, you start questioning everything. Probably 95 percent of his advice was absolutely spot on and wonderful, but a couple of things had led me to doubt him a little, I think once that’s gone it’s no good for anybody. I’d sooner start again with somebody else.”

Indeed, this proclivity was recognised by Fisher (2013) who described trust as critical in building social capital between the farming community and external advisors, without which farmers’ will lack confidence in the actions taken by these advisors and doubt the importance and usefulness of the recommendations they provide.

It is important to note that trustworthiness was not necessarily perceived in an ‘all or nothing’ manner but could be attributed by farmers in degrees, based on the management topic under consideration and how the farmer interpreted veterinarian trustworthiness in this area. For example, one farmer was happy to receive his veterinarian’s advice on animal health but very reluctant to engage in any discussion on production costs. The tendency to attribute trustworthy virtues by ‘domains’ is well recognised (Dietz and Den Hartog, 2006), and discussed by both veterinarians and farmers;

Farmer 8 “If they have experience of what I’m about to do, then their input will be valued. I wouldn’t bother to ask them about which truck I wanted.”

Vet 8 “I asked him what his cost of production was a few months ago now and I think his response was “What do you think you are? A consultant?”

The sense of trust between farmer and veterinarian was reported to build up over time and become embedded through a variety of attributes of the working relationship (Table 4-1), which encourage a bond that many felt was deeper and more loyal than many other professional roles. One veterinarian highlighted this with their observation that *‘[farmers] are more likely to change their banks than they are to change their vets’*. For many interviewees, this loyal bond was par for the course for the veterinary professional and firmly within the boundaries of professional relationships; it did not guide behaviour beyond the farm gate and did not contribute to their private social world. For others, this bond was felt to extend beyond the boundaries of the professional and was perceived as one of friendship, with individuals sharing further interaction through shared activities or

communities. Interestingly, it was not that some veterinarians and/or farmers were particularly likely to be friends with their clients (or vice versa) but a synergistic effect of individual veterinarian-farmer dyads - one veterinarian could be close friends with some farmers and not others, whilst some farmers found their veterinary relationship shifted with engagement of a new veterinarian:

Farmer 1 “I tell you how much me and [my vet] get on, we play golf together occasionally. I’m getting married in September, he’s coming to the wedding. So we’ve got a personal relationship as well as work. I think it works better if you get on with somebody. I wouldn’t have dreamt of inviting my last vet to my wedding. I was using this last vet the first time I got married and he certainly didn’t come to my wedding. [laughs] I wouldn’t even have thought about inviting the last one to my wedding, not at all. But I get on well with [my current vet]”

Ruston and colleagues (2016) observed that the strength of these types of veterinarian-farmer loyalties can blind farmers to poor standards of veterinary service, a situation they described as ‘undeserved trust’. This observation highlights a very real issue in the translation of veterinarian virtues to the decision to trust and consequent enactment of advice: farmer belief in trustworthiness does not *necessarily* reflect ‘abstract reality’ in

Table 4-1. Attributes of the veterinarian-dairy farmer working relationship that support the development of trust

Attribute	Description
Longevity	Many veterinarian-farmer relationships are established over years or even decades.
Intensity	Intense interactions are par for the course, such as working under stressful conditions late at night together for long periods, or the veterinarian being there for the farmer in times of crisis on the farm.
Frequency of communication	Most herds will receive a routine consultation weekly or fortnightly to manage fertility, within which other health matters are integrated. In addition, veterinarians are contactable for advice off the farm.
Sociality	The isolated nature of farming means veterinarians are often an important social contact for farmers.
Community integration	The integration and involvement of both veterinarian and farmer in the wider farming/social community, meaning shared personal contacts and overlapping social networks validate and strengthen the connection between veterinarian and farmer.

any one of these components, rather it reflects farmer interpretation of veterinarian personal traits and previous behaviour. This may mean that some veterinarians appear to be trusted undeservedly, whilst conversely some veterinarians may undeservedly be perceived as untrustworthy, as the farmer determines the legitimacy of these relational components.

For example, it is not hard to imagine a veterinarian who, with true ability, benevolence, integrity and potential for repeatability, on first meeting a farmer would not receive trust instantly – rather it is the contextual development of the farmer’s perception of them over time (Table 4-1) that illuminates these virtues, facilitating the decision to trust and enactment of trust (advisory behaviour change). However, this contextual development over time offers some benefits to veterinarians - both parties recognised the ‘protective effect’ of trust between veterinarian and farmer. Once this trust was established, farmers would become more forgiving of mistakes given a strong perceptual establishment of these virtues (perhaps underpinning why both parties reported mistakes early in a veterinarian’s relationship as particularly damaging).

4.3.1.6 *Trust as a component of veterinary services*

Trust is often reported as an essential component of the veterinarian-farmer working relationship (Richens *et al.*, 2016; Ruston *et al.*, 2016) but clearly this term shields much of the complexity of the relational attribute from view. It is through the complexity of this noun’s contributing features that it is possible to understand why a farmer might (or might not) listen to a veterinarian. Trust represents the components of trustworthiness (benevolence, integrity, repeatability and ability) as attributed to the contextual domain of trust, ameliorated by the depth, strength, longevity and loyalty of the relationship in question (from professional colleague to friend). Enacting behaviour in response to advice therefore becomes a complex interaction of these components, where perceptual trustworthiness leads to a decision for advice to be either worthy of associated risk (potential for farmer action) or not worthy of risk (no potential of farmer action). Veterinarians considering why their farmers fail to listen and engage with their advice could consider this perception of trustworthiness as the first step in enactment of behaviour. Careful consideration of how their farmer may perceive them across these trustworthy virtues may encourage them to alight on positive ways to enhance their interaction on farm.

4.3.2 A shared understanding

Both veterinarians and farmers reported the need for a shared understanding with the farmer – of his or her worldview, perspective and myriad aspects that could act as barriers and motivators to enacting change. The sense of shared understanding was thought to result from the unique qualities of the working relationship – a trusting relationship built on unique contextual interaction (Table 4-1) - allowing veterinarians to gain a meaningful understanding of their clients. However, this ‘shared understanding’ of ‘being on the same page’ was more than just a product of trust, it was an idealised goal that drove both parties’ actions within the advisory context, shaping the dominant consultation paradigm, veterinarian choices about advisory communication and farmers’ proclivity to engage with advisory communication.

4.3.2.1 *Veterinarian advisory choices*

Veterinarians reported two levels to understanding the farmer: a need to understand the dairy farming context, combined with an understanding of the individual farmer and his/her farming world view (the way that they perceive the farming world in which they are situated):

Vet 8: “I’d say like try and get a really good understanding of how dairy farms run and try and see as many farms as you can and I think just treat each farm as an individual. Don’t look at all farmers as the same, ‘cos some will, yeah, want to do things that others don’t. Realise that some people will, you know, want to get as much milk as they can out of a cow and not care if, you know, their average age at culling is sort of, you know, third lactation, whereas other farmers will be, you know, wanting to breed really good quality cows so that they have nice cows to look at, maybe ... like ... just everybody has different aspirations.”

Veterinarians often spoke about this shared understanding with pride, feeling that their in-depth knowledge offered them the chance to provide a unique and valuable service to their farmer(s) that is often qualitatively different to what can be provided to clients in small animal services. Indeed, veterinarians felt farmers recognised this as part of the added value in their service:

Vet 2 “I think you understand their relationship and needs better when you’ve had that continual link. Somebody coming in [to small animal practice] you have to start again really to try and understand what they really want, so... but if the dog’s broken its leg they want you to mend its leg, but if the dog’s not quite right then you don’t really know how much they want to investigate or how much they’re willing to spend etc. Where the relationship you’ve got with your [farm] client, there’s a lot of presumed stuff that’s happened already, you know... If there was a way for us to highlight to our clients the value of what we know already, you know, and how valuable that is. I think some people see it and I often talk to other vets that people are more likely to change their banks than they are to change their vets often. You know, we’ve got kind of got pretty loyal customers... So I think some of that is that we have all this intellectual property on their farms really.”

This ability to connect with the localised reality of the farm could influence all aspects of advice giving on behalf of the veterinarian, from the topics broached and interpretation of diagnostic protocols taken, to the advice given and parameters set for success. Veterinarians reported an ability to make appropriate judgements and decisions on their advisory approach and recommendations made, through knowing whether topics would be likely to be received positively or negatively (and thus whether it is ‘worth’ broaching them), what actions would be feasible for the farmer in question and/or what type of delivery of advice the farmer would be most receptive to. This encouraged a personalised service that veterinarians felt ensured appropriate recommendations to their heterogenous farming clients, increasing the likelihood of enactment of advice:

V10 “Because you know them well, you know what their expectations are likely to be. There are certain cases you would treat differently on different farms.”

Interviewer (Bard) “Okay. Can you give me an example just out of interest?”

Vet 10 “The farmer I was at this morning had a cow with an LDA [left displaced abomasum, or twisted stomach] – I saw her on Monday and I know she had two other problems, she had a bit of a dodgy hip and

she had this abscess a big abscess from a past injection and then that particular farm will cut their losses and get rid of the cow. I knew they would do that, whereas if it was at [other farmer name] he would have probably operated on again try to salvage it and get it back to ... despite having a dodgy hip you know. So that is something you know.”

For ease of discussion, veterinarians would often use this insight on their farm clients to group them by the valence of their broad overall response to advisory recommendations. Whilst varied in name, these group labels or farmer ‘types’ were semantically similar and broadly reflected binary divisions of whether farm clients were likely to enact complex change (positive) or unlikely to enact complex change (negative); for example, ‘proactive and reactive’, ‘good and bad’, ‘advice takers and advice leavers’, ‘motivated and unmotivated’, ‘listeners and non-listeners’;

Vet 7 “So you get asked to go and do a job and you’d go and do it and....and you offer advice and....and some farmers listen to you and take it and others don’t take it I’m afraid.... But the good farmers will do it.”

Vet 9 “It is probably farmer’s type, some would listen to advice and some won’t listen to advice and crash and burn.”

This ability to categorise farmers illustrates how well veterinarians felt they shared an understanding of the farmer’s context and world view. Through this shared understanding and categorisation of farmers, veterinarians felt they were able to shape delivery of advice to maximise enactment on farm. Advice giving therefore becomes a situated activity, where veterinary recommendations are an entanglement of scientific knowledge and local understanding on behalf of the veterinarian.

4.3.2.2 *Farmer engagement*

Farmers echoed veterinarian narratives on the shared understand underpinning their advisory services. Many reported a desire to feel as if the veterinarian understood their unique farming context and farming worldview, encouraging their veterinarian to ‘act accordingly’ in the advisory process;

Farmer 15 “Yeah, and I think they need to understand what you want to do. And if you’re, well, they will, they’ll know exactly what you want

to do and how focused you are to meet targets and to get cows in calf or to achieve a growth rate or to fatten a store at a certain date or whatever, and I think they'll act accordingly”

This sense of being understood by the veterinarian could add meaning to the advice being conveyed, making it more salient through the perception of relevance to the individual farmer:

Farmer 11 “It’s building up a relationship isn’t it? ... because I think my new vet’s got more background knowledge [on my farm] I would probably instigate any change on his doing so than I would have done in the past.”

Farmers recognised that having a shared understanding shaped how veterinarians gave advice, with regards to the type of recommendations the veterinarian might make and their expectations of a farmer’s response:

Farmer 8 “It’s not necessarily knowing the farm as knowing the person... that personality you feel, that relationship... that’s critical.”

In this way, farmers also recognised advice giving was most valued as a situated activity, where veterinary recommendations could not be reduced to mere scientific knowledge; local understanding of the farmer, their context and their farming worldview were critical in meaningful delivery.

4.3.2.3 *Consultation paradigm*

This sense of a shared understanding was not just conceptual but was manifested in the very behaviours surrounding the on-farm consultation paradigm. At each farm, consultations were enacted between veterinarians and farmers in predictable and repeatable ways; there was a socially perceived routine, where both parties shared an understanding about how things should/would unfold and adjusted their behaviour accordingly. This culturally shared expectation of events is well recognised and can be defined as a ‘cultural script’, a feature of social interactions of importance as scripts contribute to and inform the construction of world views and provide a framework for interaction (Vanclay and Enticott, 2011).

In the on-farm consultation paradigm for these interviewees, advisory communication was expected to informally pervade all points at which the veterinarian was present on farm. Communication was expected to occur most typically, during - and often inextricable from - the practical obligations of cow- or herd-specific tasks (such as pregnancy diagnosis checks), but also permeating any point of the visit from the veterinarian exiting their vehicle at the beginning to climbing back in at the end (whether preparing equipment, cleaning boots, walking the farm or drinking tea in the office). If paperwork or computer-based reports were necessary to oil the wheels of this communication, these could be integrated into the script of informality by their presentation within the farm environment rather than pursuing a more formalised ‘sit down’ meeting. For example, Figure 4-3 (a) shows the ‘desk’ where a laptop was set up for looking through mastitis figures and (b) the ‘desk’ where and National Milk Record (NMR, 2018) report rests as the discussion focus whilst cows were put through an adjacent crush for PD (pregnancy diagnosis) testing.

Strengthening the sense of informality further, socially orientated communication (friends, family, community, sport, leisure) was also diffused throughout the consultation in the same way, making advisory communication mirror the process of more personal engagement. If a more formal ‘sit down’ interaction was to occur within a farm visit, the

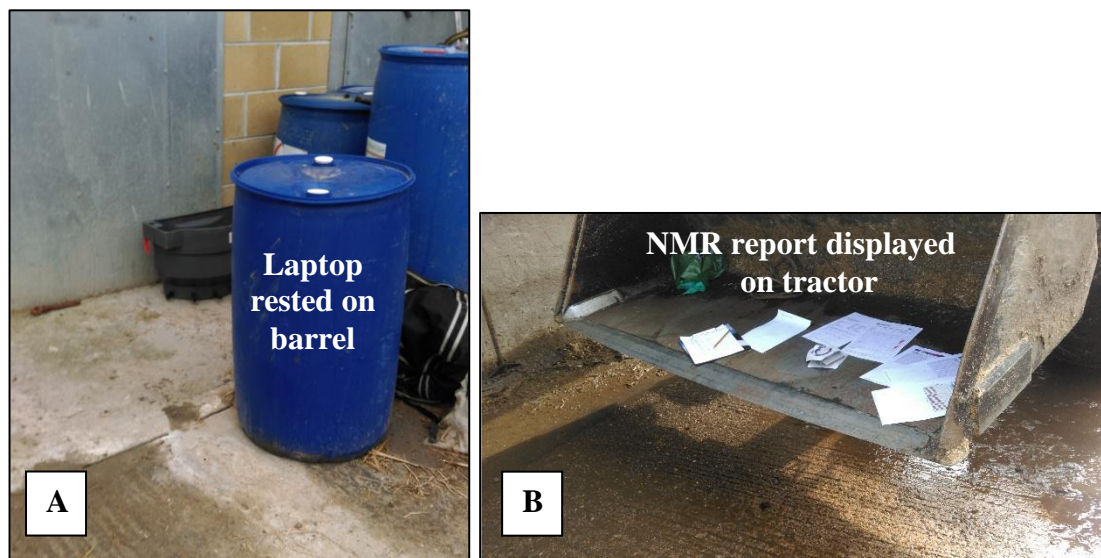


Figure 4-3. Examples of informal ‘desks’ participant veterinarians used to integrate computer and paper-based reports into the dairy consultation paradigm

thread of informality would often be maintained by the location (the farm kitchen could be used), the continued integration of social and animal health communication and the offer of hospitality (hot beverages and/or food). The latter hospitality element is so well established that it is, in itself, an expected social routine for the farm visit (Vanclay and Enticott, 2011).

If veterinarians were not willing or able to adapt their advice to this informal consultation space, farmers would have to pay significantly more for their services, being charged for both the time spent in practical cow- and herd-specific tasks in addition to a more formalised advisory consultation. Whilst the latter certainly occur, the dominant paradigm was reported to be advice delivered informally during or bridging other tasks. This consultation paradigm - a ‘cultural script’ of informality - therefore represents more than an ease of fit to the bounded environment of the farm consultations; it also implicitly signals that veterinarians share an understanding of the needs of the dairy farmer and prioritise a service that meets these needs, rather than focusing on maximising veterinary profits by demanding structured advisory meetings separate from cow-side tasks.

4.3.2.4 *Perception of a shared understanding: advisory impacts*

The dominant consultation paradigm - this cultural script of informality - combined with veterinarian and farmer narratives on advice giving embed a sense of shared understanding in the advisory process. For both parties, these features of the advisory paradigm are part of why the veterinary role has value - veterinarians can combine their abstract scientific knowledge with a local world view specific to the farm they are interacting with, ensuring that knowledge moves from generalisable to meaningful for any individual farmer. This localised interpretation of on-farm activity is echoed in Enticott’s (2012) exploration of the enactment of tuberculosis testing protocols, where veterinarians readily integrate localised knowledge into their assessment of test outcomes (with regards to the farm and local geography of disease) in ambiguous test reactors, rather than following a strict decision-making protocol.

Despite the entrenched nature of the shared understanding - shaping consultation behaviours and the expectations of the advisory interaction itself - the reality of a shared direction within the herd health advisory paradigm is often elusive. Farmers and veterinarians differ in their opinions on what the veterinary advisor’s main role is on farm (Hall and Wapenaar, 2012) and, when polled, show discrepancies in their prioritisation

of herd health topics (Derks *et al.*, 2013). These discrepancies may in fact be underpinned by this very sense of shared direction and informality, for where veterinarians fail to make goals explicit with their clients, this is reported to in part be attributed to veterinarians feeling that (i) goal documentation is ‘too formal’ and that (ii) both veterinarians and farmers are aware of each other’s wishes (Derks *et al.*, 2013). Additionally, interview data suggest that the shared understanding may simply mean communication on animal health topics is not always prioritised:

Farmer 15 “I think because we've been with them for so long and I suppose you class the older vets now as friends, you've got that personal relationship anyway and when they come out you end up talking nothing about farming, it's about other things in life.”

Vet 7 “I like the long-term relationships with [clients]. I just sometimes wonder if because of that, we look at things as properly as we should do, because we always talk about other things rather than cows.”

As a result, this perceived consensus in herd health discussion creates two issues in the provision of animal health services. First, both parties are relying on their shared understanding to guide activity on farm, yet the consensus may to some extent be fictional; this consensus may be a perceptual product of a trusting relationship and embedded cultural script, rather than a measurable construct derived from mutual understanding of animal health priorities. Second, because of this perceived consensus, agenda setting within the clinical encounter does not demand substantive attention; if there is an implicit assumption of priorities under appraisal, it does not make sense to expend time (often perceived as valuable, limited and/or costly in advisory interactions) on the processes that typify agenda setting in the clinical encounter (Figure 4-4).

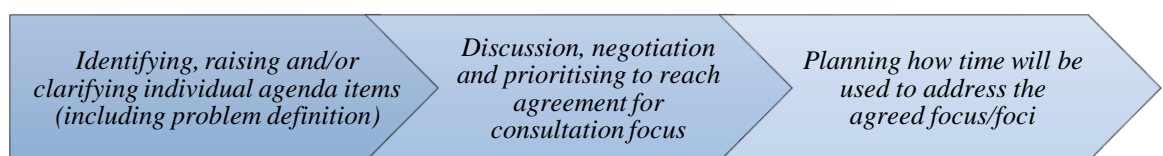


Figure 4-4. Agenda setting in the clinical encounter (Gobat *et al.*, 2015).

This is to the detriment of the herd health consultation, as agenda setting offers numerous benefits within advisory encounters; in the medical sciences, both advisors and clients experience greater satisfaction with the clinical interaction given agenda setting processes, patients experience enhanced motivation towards positive behaviour change for their illness and/or recovery and time is more efficiently utilised (Gobat, 2014). The cultural script of informality may also blind both parties to the meaning and value of more formal veterinary interactions. Farmers were particularly vocal about the issues implicit in herd health plans (HHP), summarised by this farmer:

Farmer 1 “It’s [HHP] a chore we have to do unfortunately. It’s something and nothing really, we know what we doing from week to week, we always know what’s going on between the two of us, we chat about things anyway, it’s just that once a year we’ve got to review this thing, he’s got to sign it, I got to sign it we make sure everything’s in place that we’re doing... To be honest I wouldn’t look at the herd health report from one year’s end to the next.”

Here the contrast to the cultural script of informality is highlighted: for the farmer, the demand to sit down formally once a year and define a herd health plan is ‘something and nothing’, a stark comparison to the shared understanding that manifests through informal and situated practice of herd health advice. This violation of the cultural script deprives the HHP of its place among acceptable farm consultations; at its heart is a conflict with the idealised informal approach. This conflict may to some extent explain the dissatisfaction and mixed responses with its use (Bell *et al.*, 2006).

4.3.3 Meaning is manifest at a local level

Vet 9 “To be honest it is very complex it really is and there is no telling who is going to listen to your advice and who isn’t because you know the veterinary aspect. I know the very narrow veterinary aspect but there are so many factors in the game. From price of milk to relationship with dad to relationship with the bank manager to you know.”

Underpinning the multitude of descriptions on enacting change was one common narrative: that for knowledge to be enacted a farmer must view the advice as meaningful in the local context of their farming world view. This narrative underpins the value of a

shared understanding in the veterinarian-farmer partnership, as an accurate conception of the farmer’s world view was perceived to enable successful targeting and delivery of veterinary advice. However, as the veterinarian quoted above recognised, there are myriad ‘factors in the game’ that contribute to this local interpretation, creating a complex web of interconnected considerations for the farmer that act in synergy to evaluate an advisory topic. Interview data suggest that for advice to manifest meaning in the farmer’s eyes, it needed to either be congruent with the farmer’s world view or – if it was not congruent - sufficiently salient to catalyse the recalibration of this world view in a way that would lead to integration.

4.3.3.1 *Congruence with the world view*

The world view of the farmer was invoked through the integration of diverse factors, broadly relating to the aspects of the farmer’s individual, social and environmental influences; those explored by interviewees are presented in Figure 4-5. The first area of influence can be considered as pertaining to the individual farmer - their priorities, belief in solution(s), belief in the problem, habitual processes, emotional responses and perceived role of and relationship with the advisor. For example, when considering farm priorities, one farmer recounted the experience of a fellow farmer prioritising yield who struggled to ‘register’ veterinary advice on diet that conflicted with this priority:

Farmer 7 “[The farm] needed to drastically change the way the cows were fed really, in my opinion. They had a lot of very over fat cows that was leading on to the DA (displaced abomasum) problem. It was a fundamental change that they needed to do but they didn’t want - by doing that it needed to cut the yield... There was perhaps a case in point. That farm in effect was run by an accountant who financially was overseeing the farm, and as soon as you mentioned anything that would cut the yield, and obviously potentially cut the income, he really didn’t want to know... Yeah. So even though the vet was pointing out to them every month exactly how many DA’s they were having, that didn’t seem to register...”

For the farmer described, the farming world view might include the narrative; ‘*I need to maintain yield to be able to make a profit*’, making advisory recommendations that do not intuitively connect with this narrative difficult to engage with.

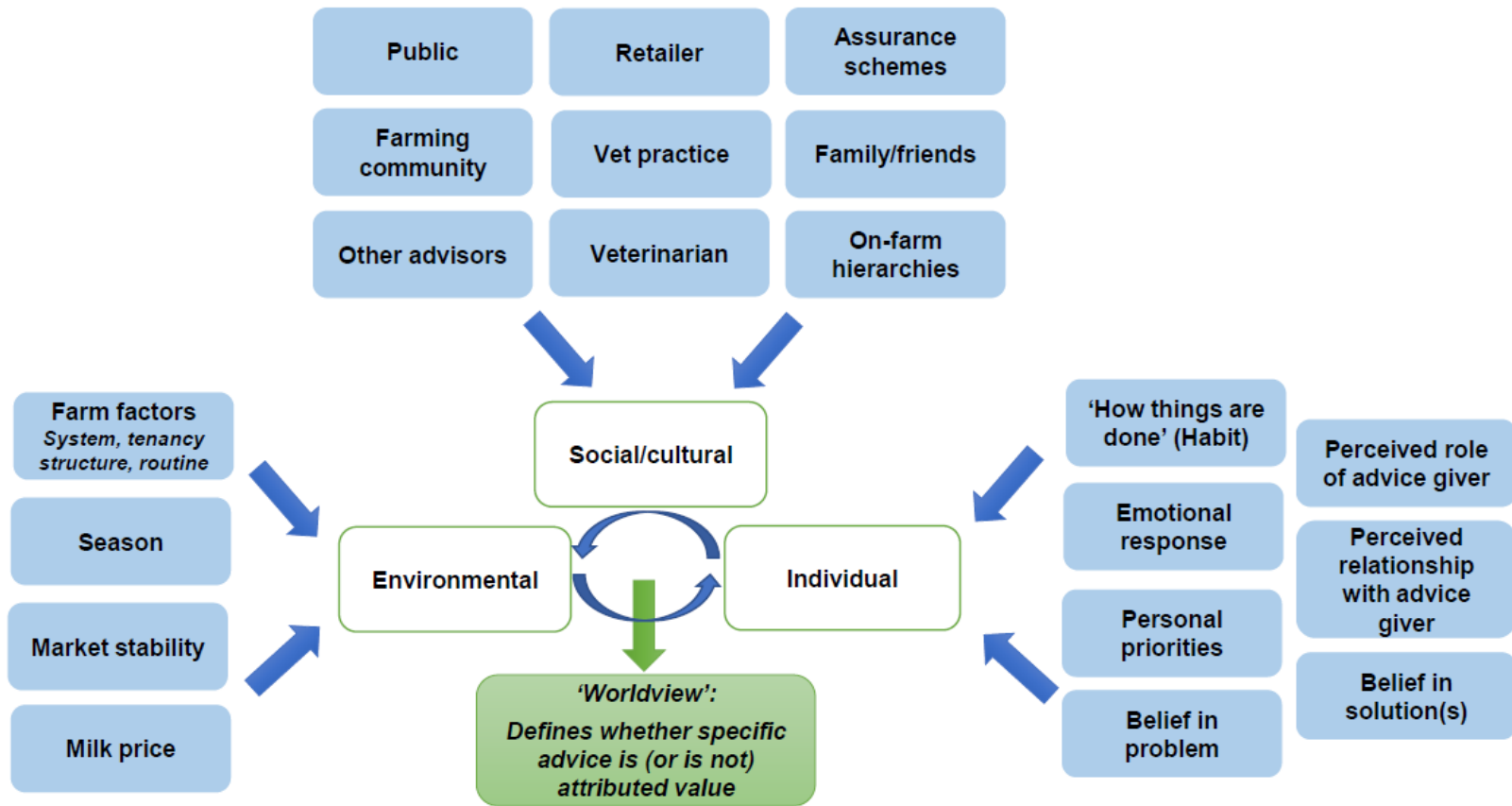


Figure 4-5. Factors reported by interviewees as contributing to the world view of the farmer, broadly relating to the aspects of the farmer's individual, social and environmental world

Another influence stemming from the perception of the individual farmer was the expectation of the advisory role. One veterinarian reflected upon the difficulties of engaging farmers in proactive advisory interactions when their perceived role was more technical:

Vet 8 “I asked him what his cost of production was a few months ago now and I think his response was “What do you think you are? A consultant?” ... I feel like I just go and PD [pregnancy diagnose] his cows, which is kind of wrong because he could turn round and get a technician I guess to do what I do, but I don’t really advise him that much, whereas other farms I’m sort of more, yeah more of an adviser than just a technician I guess.”

For the farmer, this interaction perhaps reflects a farming world view of something like ‘*I need my vet for practical fertility work, but for business matters I go elsewhere*’, meaning the veterinarian’s advice would be unlikely to manifest meaning in the area of production costs.

With regards to aspects of social influence, narratives included the farmers friends and family, on-farm hierarchies, the farming community, the veterinarian and their practice, other advisors (agronomists, foot trimmers, nutritionists, etc.), retailers, farm assurance and the non-farming public. For example, when one farmer discussed his approach to field management around his farm, the social effect that the farming community could have on his enacted behaviour was clear;

Farmer 9 “I own that piece of land out on the dual carriageway as you turn in. It’s right on the dual carriageway. Every farmer goes past that and it rises up from the road. I grow maize there. That field gets everything it needs because every farmer looks at that.”

For this farmer, their world view might include the narrative ‘*I want to be perceived as a good farmer*’. External recommendations pertaining to the flourishing of this field in view of the farming community would therefore be perceived as valuable. This interaction between perceived social significance and management behaviour was recognised by Burton (2004) who identified that for farmers, this ‘roadside farming’ process was centred around the idea of maintaining social status. Farmers interviewed in Burton’s (2004) study acknowledged, without exception, that this social influence of the farming

community affected on-farm management decisions (despite being reluctant to admit their own participation in the practice).

The final area of influence were aspects broadly considered as environmental - farm factors (restrictions of system, tenancy structure, routines dictated by the farm physical set up), the season, market and milk buyer. For example, one farmer reflected on how their decision to put milking robots on their farm the year before would not have happened in the current climate, given the need to ‘watch every cost’ and be cautious with expenditure:

Farmer 7 “I think at the moment what would hold people back is, dare I say it, milk price. Because it’s restricting of, you know, farmer’s having to watch every cost because of it and likewise they’re not able implement various things because of the milk price, and present cuts imminent. This time last year we were just started putting in our second robot. If it were the same time now with our milk price, we wouldn’t have done that.”

The farmer’s world view appears to have moved from something like ‘*We can be optimistic and invest in the farm*’ to ‘*It pays to be cautious at present*’, which they perceive as influential on how they interpret information and make decisions - so much so that the decision to enact a significant management change is seen completely differently when considering subsequent changes in the milk price.

These influences are not ‘stand-alone’ aspects as the farming world view is a cumulative synergy. For example, if the above scenarios framed the internal narrative of one individual, their wish ‘*to be perceived as a good farmer*’ will have to balance their sense that ‘*it pays to be cautious at present*’ and ‘*I need to maintain yield to be able to make a profit*’. As such, the value of behaviour that enables the field seen by the farming community to flourish may be diminished by the need to spend extra money that could be focused on driving the yield forward. In this way, competing influences create an internal narrative determining the interpretation and judgement of advisory recommendations. It is perhaps for this reason that veterinarian narratives and consultation paradigms intuitively reflect the need to develop and harness a shared understanding with the farmer to deliver recommendations with which farmers will engage.

4.3.3.2 *Catalysts for recalibration of the worldview*

If a recommendation was not aligned with this existing world view, this did not (necessarily) mean it would not be enacted. Narratives on the change process suggested that meaning was often not purely a function of the alignment with the farming worldview, but whether the circumstances under which it was received were sufficiently salient that advice could manifest meaning nonetheless. In this way, certain circumstantial aspects of advice giving could recalibrate farmer interpretation of advisory content, which can be broadly thought of as those relating to the practical or relational mode of advisory delivery.

4.3.3.2.1 Relational saliency

In this interaction, the veterinarian reflects on an instance when their advice spontaneously found meaning after seven years of the same message:

Vet 3 “A classic was I’d been working on one guy for about seven years about his mastitis and how he milked his cows which was basically a 20:20 herringbone parlour. He’d start at the front, going all the way down and wiping the cows and then come all the way back putting the clusters on and I was trying to tell him, ‘Go back to the front and do it the same way.’ I’ve been telling him that for ages. Then we had a mastitis meeting one evening and [respected industry specialist] said just the same thing and he did it overnight... The guy started it the next day and never looked back.”

For this farmer, the relational context under which the advice was given embedded the advice with new meaning; the same content, under a novel relational circumstance, inspired him to enact change. It was the advisor giving the message - more than the message itself- that gave the message saliency and inspired enactment.

This relational enactment of meaning was recognised in myriad circumstances, for example interactions between farmers and respected speakers (such as at group meetings with industry specialists, industry conferences, producer meetings), specialist advisors (nutritionists, foot trimmers, agronomists), other farmers, family and friends. This effect may be a result of the virtues of trustworthiness necessary for enacting behaviour being amplified in these change advisors. For example, if a speaker was recognised by a farmer

as having special *ability* in a topic of interest, their recommendation for a specific change measure may resonate more strongly:

Farmer 8 “The nutritionist, I use them a lot. Robbie would feed hundreds of cows all over the country and if we’ve had a problem here, nine times out of ten he has had that problem somewhere else and he can help us sort it quite quickly. He has been his weight worth in gold for us.”

Similarly, when hearing a recommendation from another farmer, the virtue of *integrity* behind the advice appears to be amplified, given the farmer is reporting a real change they have witnessed in action and dishonesty would arguably bring them no benefit;

Farmer 10 “That farmer will tell you ‘well you know, I had a problem, this is what I chose to do to improve it’ and he’ll tell you whether it has improved it, you know? ... There’s no better way really than talking to the actual farmer really, they’ll tell you the truth most of the time.”

This relational amplification of trustworthiness thus increases saliency in advice, manifesting meaning in recommendations where the farmer’s world view may fail to do so. Evidence that veterinarians strove to manipulate these perceptions suggested an awareness of this relational effect on the meaning in their advice. For example, veterinarians would self-identify as part of a ‘progressive practice’ and emphasise this as part of their service, a label inferring a focus on change and innovation as part of their identity. Embedding this sense of identity in their service was reported to encourage farmers to enact advice:

Vet 9 “As a progressive farm practice then we have got a lot to offer and they have opened their eyes and all of a sudden they want to do a lot of things right. Certain things that they have accepted in previous years, they actually see they are not right and we can together change it, so it is quite exciting.”

The simple difference of being part of a ‘progressive’ versus ‘traditional’ practice perhaps amplifies veterinarian virtues of integrity and ability with regards to novel and innovative ideas, increasing the saliency of advisory messages to farmers. The idiom of encouraging

farmers to ‘open their eyes’ suggests that it seemed to this veterinarian that farmers are able see the truth of the recommendations differently in this proactive practice context.

Veterinarians also strove to become specialists in their areas of interest through training and/or involvement in specific management or research foci (e.g. becoming the practice specialist in lameness or having cattle as their species specialism). This reflects veterinarian interest, but also an awareness that these labels matter when talking to farmers; in some way being a ‘practice specialist’ augments their virtues of *ability* and *integrity* in their chosen area(s), enhancing the potential for advice to manifest meaning for the farmer.

Veterinarians would also encourage group meetings in which their advisory recommendations could be voiced by other relational parties, relying on the views of other specialists or farmers to invoke meaning in the recommendations they were hoping to build engagement with:

Vet 17 “I remember quite a few years ago I went to a meeting that [industry specialist] did for us on lameness, it must have been ten years ago now, in a farm just up the road and he was just brilliant, he hardly said anything and he got the farmers to basically tell each other all the things that you’d want to have said at that meeting and he just sort of teased it out of them, so, I’m nowhere near as good at it as he is, but I sort of tried to adopt that approach... usually within the room the knowledge is there any way it’s just sharing it and repeating it.”

4.3.3.2.2 Delivery saliency

Advisory meaning could also manifest because of delivery saliency, where four core areas were discussed: message consistency, tangibility of change, communication attributes and delivery mode/medium. These aspects underpinned the saliency of all advice but could be interpreted as particularly useful as a focus in instances of incongruence with the farmer’s world view.

Novel messages where farmers were able to ‘see the change’ in action, such as seeing another farmer or veterinarian using a new piece of equipment or viewing the results of change on other farms (whether in action or through improved health/production figures) enhanced saliency of management recommendations:

Vet 9 “That pump that [farmer x] was mentioning... No we don’t want to buy that, it cost £80.00... then something happened... he saw that when we drenched cows with our pump it worked so he bought a pump. And all of a sudden that pump is fantastic... you don’t want to buy a pump fair enough. I use my pump on certain animals and hopefully you wake up to the idea.”

This delivery perhaps also amplifies a necessary component of trustworthiness in advice - that of integrity. ‘Seeing the change’ in the proverbial flesh and witnessing the benefit first-hand counteracts any reasonable doubt in the efficacy of advice. This transparency of efficacy perhaps contributes to the effectiveness of benchmarking for engaging farmer motivation, as the sense of ‘seeing the change’ in other farmers’ practices is implicit in the process of data access and peer comparison, argued by Sumner, von Keyserlingk and Weary (2018) to stimulate instrumental value in the benchmarking process. The strength of this effect may also be amplified in the benchmarking process given the relational saliency of the individuals who create and validate the data (fellow peers/farmers):

Vet 9 “We do benchmarking meetings which again if you put them in a competition against each other that is the main driver for them to do better. But while you discuss the results that they each have, you can then say ‘Right actually if you do this and [Farmer A] you did that didn’t you?’. ‘Oh yes’, and we said ‘Yes’. ‘That’s it no more mastitis my calves are looking a lot better’ and all the others their ears prick up, you can see them going ‘Hmm’. And then they come up to you and say ‘So do you think [the practice specialists] could come up and weigh the calves and have a look at how much we feed and how bedding we put?’. Through the other farmers that is a major way to a farmer’s sort of idea that they need to change.”

Another aspect of delivery salience is the communication approach utilised by the veterinarian. Both veterinarians and farmers reported a variety of communication behaviours, attributes and ethos (Appendix 6) that are desirable and undesirable in the dairy context. From both a veterinarian and farmer perspective, desired qualities tended to reflect a mutualistic communication paradigm, for example where client opinions were

actively sought, negotiation and collaboration led to an openly agreed upon plan and active empathic skills are used (Roter 2000):

Farmer 1 “Vets do know the academic side, they’re bright lads and lasses... but sometimes it doesn’t hurt to stop talking and start listening when you go on farm.”

Undesirable communication attributes were generally associated with making the farmer feel ‘less than’ the veterinarian in some way, such as chastising, blaming, judging, using jargon, rudeness or assuming farmer wants/needs:

Farmer 8 “I won’t go back to those that think... “I’m a professional and you’re just a dairy farmer.”

These reported behaviours suggest that farmers are perhaps looking for more than just accurate scientific advice in their communication experiences; they are seeking social connection underpinned by social respect and veterinarian virtue (indeed, desired behaviours (Appendix 6) again echo the components of trustworthiness - benevolence, ability, integrity, repeatability). Both veterinarians and farmers reported desirable communication features as associated with positive outcomes, such as engaging farmers better in conversations, protecting a sense of pride, promoting ownership over behaviour changes and enhancing satisfaction and adherence to veterinary recommendations. These findings are supported by existing literature on veterinary communication; the use of a relationship-based approaches is associated with enhanced client satisfaction (Coe, 2008) and enhanced adherence to veterinary recommendations (Kanji *et al.*, 2010). It is possible that conscious and deliberate adoption of these features might therefore encourage advisory recommendations to manifest meaning for farm clients, particularly given the reflection by one veterinarian that these relationship-centred skills are not consistently enacted in farm practice:

Vet 3 “As a profession I think generally speaking we’re not very good at listening to what they say and we tend to go in and say ‘I want to talk to you about Johne’s’ or ‘I want to talk to you about BVD’. And actually the fact they’ve got 40 cases of mastitis in the last month is far more important at that particular moment.”

The means of delivery of advice, whether providing information in person, in paper form, via email, by phone or by tablet, was felt to provide different opportunities for engagement and understanding. For example, one veterinarian reflected on his habit of following an advisory discussion on an National Milk Record (NMR, 2018) report by leaving a hard copy of the elements discussed with the farmer. This action was felt to determine how the farmer would ultimately perceive the advisory recommendations given by the veterinarian in person, by giving them the chance to ‘tickle their mind’ in his absence:

Vet 3 “I tend to leave [the report hardcopy] there so they can go back and think, “Oh, what was he on about?” But also it just lets it tickle in their mind so they... The best way of getting things to change is if they think about it and want to change, rather than they feel they’ve got to because you’ve told them.”

For this veterinarian, the integration of multiple delivery mechanisms allowed their advice to be ‘present’ on the farm in their absence, moving it from a something to be pushed on the farmer in the moment to something that could be mulled over and engaged with in choice. Veterinarians reported working out by trial and error which farmers would be receptive to which delivery types to allow their advice to permeate beyond the boundaries of just face to face contact to enhance saliency:

Vet 9 “Like sometimes I’ll like send an email with some information on or put something in the post like an article explaining something that we’ve talked about on the farm. Some farmers are like “Oh did you?” and I know like they definitely haven’t read it, whereas others are like ‘Yeah yeah. That was good.’ So you sort of learn who it’s worth doing that kind of thing for and who are more receptive to that sort of information I guess.”

Finally, novel messages that were felt to be consistent with those held by other social contacts - such as within veterinarians in the same practice, between veterinarians and outside advisors (such as foot trimmers), or between veterinarians and farming contacts - were reported to have the potential to be viewed more favourably:

Vet 1 “I think it’s really important that there are consistent messages coming out and so those messages will be coming out from me but also from my colleagues so that we’re all saying the same thing.”

It appeared that the same perceptual virtue that underpinned veterinarian trustworthiness - predictability (consistency) of individual response - was also of value as an attribute of the message itself; agreement with a variety of change advisors provided assurance of meaning in the recommendation.

4.4 Conclusions: prescriptions for practice

Interview data suggest that in discerning the factors that influence the enactment of veterinary advice what is ‘science’ and ‘knowledge’ can never be fully disentangled from what is local and relational; enacting advice requires this positive entanglement of both these qualities. When considering whether advisory recommendations are likely to be engaged with, veterinarians should consider both qualities to guide the likelihood of positive advisory engagement.

The integration of the themes in this chapter can be thought of as defining a ‘threshold of meaning’ advisory recommendations must exceed for enactment of behaviour change to follow (Figure 4-6). First, veterinary advisors must be considered in a place of trust; without this quality in the working relationship advisory recommendations will not readily be integrated and enacted (1). Second, advice must either align with the farmer’s local world view (2a), or if not, be of sufficient relational or practical salience that this world view is reconfigured (2b). If the shared understanding between veterinarian and farmer is accurate, knowing whether an advisory recommendation will initially align with this world view appears to be intuitive. However, given support for the assertion that this understanding is often mismatched (Derks *et al.*, 2013) careful attention to communication about farmer goals and values should precede any such intuitive assumption. If the farmer’s world view is unknown or is at odds with an advisory recommendation, consideration of the delivery of advice offer the opportunity to manifest meaning in otherwise insignificant recommendations. Communication acts both as a foundation in this process, with desirable communication being fundamental to the positive interactions that build perceptual trustworthiness (Table 4-1), and as a catalyst on the farming world view given desirable (relationship-focused) communication attributes. A case study of these themes in action is provided in Appendix 7.

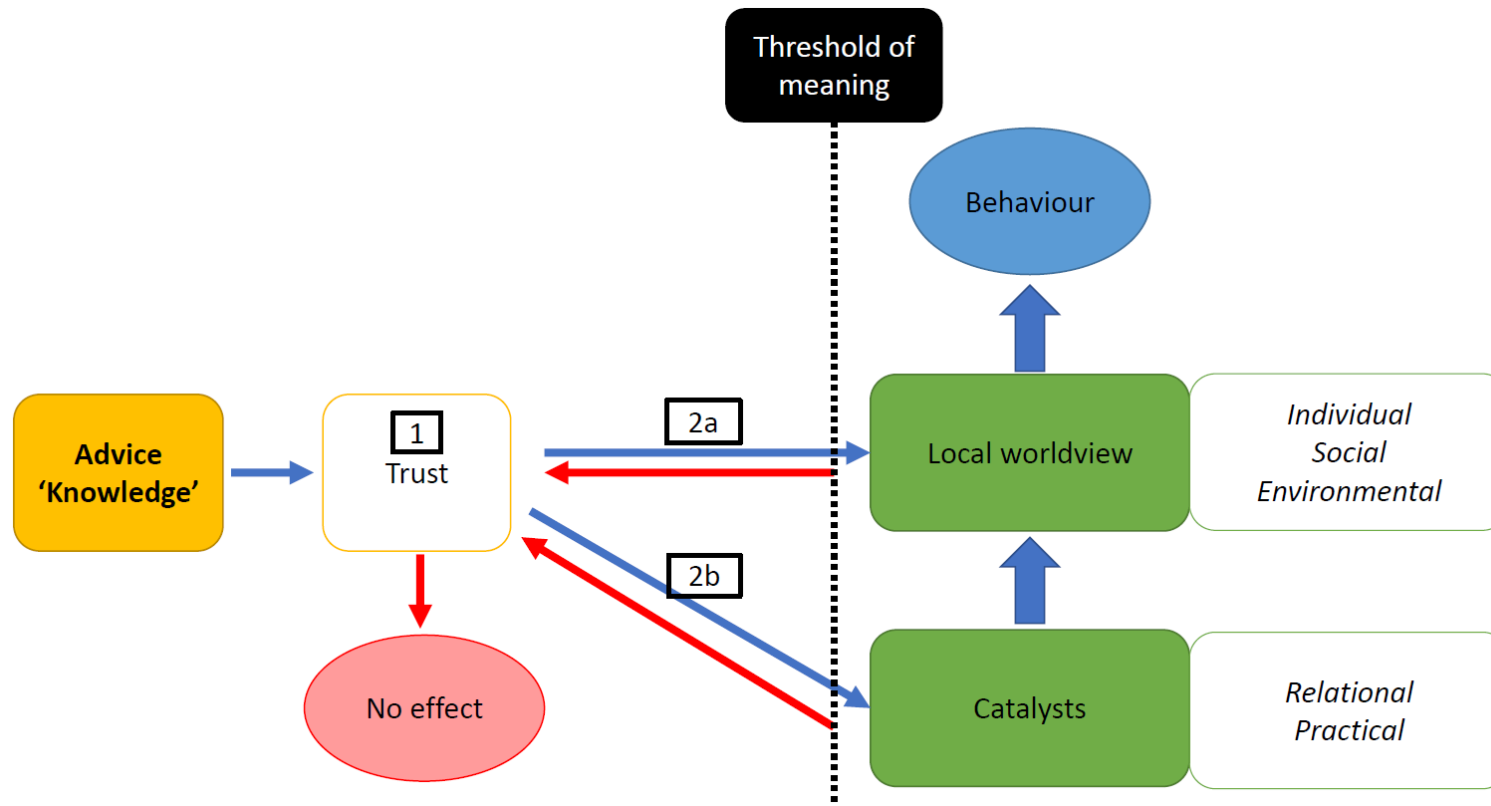


Figure 4-6. The integration of chapter themes to define a 'threshold of meaning' advisory recommendations must exceed for enactment of behaviour change to follow

4.4.1 Motivational Interviewing and the herd health advisory paradigm

The connection between how veterinarians and farmers perceive the enactment of advice on dairy farms shares commonality with the philosophy and practice of MI. First, the Spirit of the methodology is built upon collaboration, engagement, empathy and evoking client views of their context, with a foundation of shared understanding and collaborative focus with a client being part of any conversation on the pursuit of change (Miller and Rollnick, 2012). This ethos is echoed in the cultural script of informality between veterinarians and farmers, built upon a sense of ‘being on the same page’ and of understanding the direction the farmer wishes to take their herd and farm. In this way, the philosophy of MI interaction is in congruence with the expected unfolding of the on-farm advisory interaction.

Second, the relationship-centred approach of MI communication emphasises a mutualistic communication paradigm where client opinions are actively sought, negotiation and collaboration lead to an openly agreed upon plan and active empathic skills are used (Roter, 2000). MI therefore reflects the communication behaviours, attributes and ethos reported as desirable by both veterinarians and farmers (Appendix 6), with those that are undesirable (such as pushiness, judgement, anger, blaming and chastising) explicitly in conflict with the philosophy and practice of MI (Miller and Rollnick, 2012). This would suggest that the core communication skills employed in MI would be well received in the herd health paradigm, given veterinarian and farmer reports of these desirable communication features as associated with positive outcomes such as engaging farmers better in conversations, protecting a sense of pride, promoting ownership over behaviour change and enhancing satisfaction and adherence to veterinary recommendations.

Thirdly, the emphasis within the MI methodology on compassion as a core component of MI Spirit (Miller and Rollnick, 2012) supports the embedding of benevolent intention within the herd health advisory paradigm, critical to developing trust between veterinarian and farmer. Where services offered to farmers come at a financial cost, specific attention to and promotion of compassion by veterinarians would not only promote advisory behaviours that stimulate trust from farm clients (who perceive the veterinarian to be promoting their interests, not merely profit), but also encourage advisors to work with

clients in a non-judgemental, non-blaming and empathic way that will enhance their understanding of the farmer’s world view.

Finally, this exploration of nuance in the herd health advisory paradigm highlights that farmers are often looking for more than just accurate scientific advice in their advisory and communication experiences; they are seeking social connection underpinned by social respect and veterinarianian virtue. The specific attention given to the advisor-client relationship in the MI methodology - with conscious and deliberate attention to relational features of compassion, acceptance, partnership and evoking (Chapter One)- is likely to facilitate an approach to herd health advice that encourages advisory recommendations to manifest meaning for farm clients.

4.5 Study limitations

This research study was a qualitative approach to understanding nuance within the herd health advisory paradigm. This approach allows researchers to explore and uncover the complexity of interviewee experiences within a certain field, rather than seeking to quantify opinions within a select group or generate a representative sample of those opinions (Vaarst *et al.*, 2007). As such, this author intends for these outcomes to be a rigorous, valid and detailed insight into this advisory paradigm, rather than a representative description. However, due to reaching data saturation, the author was assured that adequate and quality data were collected in this study sample.

The recruitment process in this study followed a protocol of communicating with the dairy farmer as the first point of contact, whose interest in the study stimulated further contact with their veterinarian to ascertain permission for dual participation in the study. As such, study recruitment may have favoured farmers with relatively better or more comfortable relationships with their herd veterinarian. However, as the interview process involved the discussion of experiences over the course of a farmer’s lifetime - exploring interactions with both current and past herd veterinarians in addition to experiences with wider members of practice teams - this study limitation was felt to have been mitigated to a reasonable extent (all farm participants had both good and bad experiences to recount and reflect on).

Chapter Five

Veterinarian communication and Motivational Interviewing:
a preliminary investigation of current veterinarian skill and
feasibility testing of the MITI 4.2.1 for consultation analysis

*“If you treat an individual as he is, he will stay as he is,
but if you treat him as if he were what he ought to be and could be,
he will become what he ought to be and could be”*

Johann Wolfgang von Goethe

Abstract

Research on current veterinary communication in the pursuit of farmer behaviour change (Chapter Three) has established a need to adopt a mutualistic approach to herd health advisory discussions. One methodology that meets this description whilst also being congruent with the herd health advisory paradigm (Chapter Four) is Motivational Interviewing (MI). At present, no data exists exploring veterinarian's use of MI skills, meaning there is a dearth of knowledge on (i) current veterinarian skill in the features of MI; (ii) client response to these skills; and (iii) the feasibility of analysing MI skill in veterinary communication using validated coding schemes. This chapter presents exploratory analysis of role-play interactions (n=15) between UK cattle veterinarians and an actress experienced in medical and veterinary education to determine whether a training intervention would be appropriate in this context, in addition to exploring the feasibility of coding veterinarian speech using the Motivational Interviewing Treatment Integrity (MITI) code.

Analysis indicates that veterinarians do not currently utilise MI skills at a level of basic competency. However, MI-consistent skills do occur spontaneously within consultations, with their presence significantly associated with client perception of autonomy and collaboration within the interaction. These features suggest a training intervention in the methodology would be of use in the herd health advisory context. To support the analysis of such an intervention, the MITI 4.2.1 code is established as a useful tool, with recommendations made to enhance data utility in an intervention approach. Namely, the pursuit of a coding strategy that also records farmer change language, the temporal relationships between veterinarian and farmer verbal behaviour and durations of verbal behaviours. A description of how these recommendations were realised in a feasibility study (Chapter Six) concludes the chapter.

5.1 Introduction

Recent research (Bard *et al.*, 2017, Chapter Three) has called for a paradigm shift in veterinary communication in the pursuit of client behaviour change, to encourage veterinarians to adopt a more relationship-centred approach where clients' opinions are actively sought and open negotiation leads to a mutually agreed plan. Since relationship-centred communication has been shown to significantly enhance client satisfaction in small animal practice (Coe, 2008) and, in human medical contexts, demonstrates a positive relationship to physician and patient satisfaction (Roter *et al.*, 1997) and patient health outcomes (Stewart, 1995), this type of approach may offer important improvements in farmer engagement with veterinary herd health advice. In support of this assertion, detailed qualitative examination of the herd health advisory paradigm (Chapter Four) suggested that whilst veterinarians recognise that advice can manifest meaning through a variety of features of the on-farm advisory paradigm (communication, the relational/practical elements of advice giving and the social, environmental and individual factors enmeshed in the implementation of change), they are failing to fully harness communication attributes as a mechanism for engaging farmers with change.

One communication methodology with the potential to enhance advisory interactions on herd health is Motivational Interviewing (MI). Training in MI would facilitate the adoption of a more relationship-centred approach in the herd health consultation, given its foundation in the client-centred and empathic style of Rogerian psychotherapy (Miller and Moyers, 2017). Additionally, the Spirit of MI - built upon collaboration, evoking farmer ideas and mutual understanding - echoes the cultural script of informality between veterinarians and farmers, fostered by a foundation of feeling 'on the same page' and having a shared understanding (Chapter Four). Where at present there is incongruence between this relational narrative conveyed by veterinarians and farmers and actual communication practice (Chapter Three), MI offers the exciting opportunity to translate this cultural script from a mere relational identity to a realised aspect of communication. Combined with the technical focus of MI to shape farmer intention towards change, manifesting practical aspects of Self Determination Theory (SDT) (Ryan and Deci, 2000) that are as yet unexplored in veterinary research literature on farmer behaviour change (see Chapter One), MI represents both a timely and apt intervention for the enhancement of the herd health advisory paradigm.

At present, no data exists exploring veterinarians' use of MI skills, meaning there is a dearth of knowledge on (i) current veterinarian skill in the features of MI; (ii) client response to these skills; and (iii) the feasibility of analysing the use of MI in veterinary communication with validated coding schemes. To determine whether a training intervention would be both useful and practically feasible in this context, exploratory study is essential. This chapter utilises role-play data collected for qualitative analysis (Chapter Three) to inform a potential training intervention in MI, determining (i) whether veterinarians currently meet the standards for MI adherence defined in the Motivational Interviewing Treatment Integrity code (MITI 4; Moyers, Manuel and Ernst, 2014) in herd health consultations; (ii) whether these skills are meaningful for the client (with regards to reported experience of collaboration, evocation and autonomy support); and (iii) recommendations for applying MITI 4 (Moyers, Manuel and Ernst, 2014) coding in an MI training intervention in this context.

5.2 Role-play: Materials and methods

5.2.1 Ethics statement, Research methodology, Participants

Please see Chapter Three for details. Data from this study are drawn from the role-play session on lameness and mastitis from veterinarians (n=15) and an actress experienced in medical and veterinary communication education.

5.2.2 Assessing current veterinarian skill: MITI 4

Consultations were analysed using the MITI 4 (Moyers, Manuel and Ernst, 2014), a treatment integrity measure for clinical trials of MI. This code evaluates component processes critical to MI (Moyers et al. 2014). Verbal interactions are coded in a tally system (pen-and-paper) for frequencies of verbal behaviours and global scores (Table 5-1). For verbal behaviours, discourse is broken down into volleys (uninterrupted segments of veterinarian speech) and coded for utterances (complete thoughts) reflecting verbal behaviours of giving information, persuading, persuading with permission, questions, reflections (both simple and complex), affirmations, seeking collaboration, emphasising autonomy and confronting. If codes occur multiple times per volley, only one count is recorded. For global scores, the coder assigns a single number on a five-point Likert scale (from 1: low proficiency to 5: high proficiency) to characterise the entire interaction, providing an overall judgement about the global interaction measures of cultivating

Chapter Five – Investigation of current veterinarian MI skill and MITI 4 feasibility testing change talk, softening sustain talk, partnership and empathy. To meet the level of ‘fair competency’ in MI, veterinarians had to gain a mean score of 3.5 in relational globals (partnership, empathy) and 3 in technical globals (cultivating change talk, softening sustain talk), a reflection to question ratio of 1:1 and 40% complex reflection percentage (of total reflections). Coding was performed directly from audiotapes.

Table 5-1. Description of Motivational Interviewing Treatment Integrity Code (Moyers, Manuel and Ernst, 2014)

MITI code	Brief description
Global scores	
Cultivating change talk	Encourages the client’s own language in favour of the change goal and confidence for making that change
Softening sustain talk	Avoids a focus on the reasons against changing or maintaining the <i>status quo</i>
Partnership	Conveys an understanding that the expertise and wisdom about change reside mostly within the client
Empathy	Understands or makes an effort to grasp the client’s perspective and experience
Behaviour counts	
Giving information	Gives information, educates, provides feedback or expresses a professional opinion without persuading, advising or warning
Questions	Question (open or closed)
Simple reflection	Repeats, re-phrases or paraphrases the client’s previous statement adding little or no meaning or emphasis to what the client has said
Complex reflection	Repeats, re-phrases or paraphrases the client’s previous statement adding substantial meaning or emphasis to what the client has said
Affirm	States something positive about the client strengths, intentions, efforts or worth
Emphasise autonomy	Highlights the client’s sense of control, autonomy or freedom of choice over change
Seek collaboration	Explicitly attempts to share power or acknowledge the expertise of the client
Persuade with permission	Includes emphasis on collaboration or autonomy supportive language when persuading/using direct influence
Persuasion	Overt attempts to change client opinion, attitudes or behaviour (using facts, compelling arguments, logic, self-disclosure) or giving biased information, advice, tips, opinions, suggestions or solutions
Confront	Directly and unambiguously disagreeing, correcting, arguing, shaming, blaming, criticising, warning, labelling or questioning client honestly

5.2.3 Assessing client response: MIMSI and MITI 4 correlation

After each consultation, the role-play actress was provided with an adapted version of the Motivational Interviewing Measure of Staff Interaction (MIMSI) scale (Hohman and Matulich, 2010; Table 5-2). The MIMSI is a Likert-scale questionnaire that endeavours to capture client perception of autonomy support, collaboration and evocation within the consultation, through asking the client to rate agreement with ten statements on a five point scale (strongly disagree, disagree, neither agree nor disagree, agree, strongly agree) (Hohman and Matulich, 2010). The role-play actress was blind to the study focus on MI and was advised that the MIMSI represented a general communication report.

MIMSI and MITI 4 data were analysed statistically (SPSS Version 23; IBM Corp., Armonk, NY) to determine the strength and direction of associations between veterinarian and actress data. Veterinarian verbal behaviours of MI-consistent (MI-adherent, reflections), MI-inconsistent (MI-inadherent) and MI-neutral (giving information, question) and actress response (autonomy, collaboration, evocation) were explored for linearity, outliers and normality, resulting in a Spearman's rank correlation between veterinarian-actress pairs.

Table 5-2. Adapted Motivational Interviewing Measure of Staff Interaction

Factor	Statement
Collaboration	The vet helps me to recognise my strengths.
Collaboration	The vet is curious about my thoughts and feelings.
Collaboration	The vet asks me about my own goals.
Collaboration	The vet helps guide me to make good decisions for myself.
Collaboration	The vet helps me look at both sides of a problem.
Evocation	The vet finds it easier to tell me what to do instead of asking for my input.
Evocation	I feel hurried and rushed when talking with the vet.
Evocation	The vet gets angry with me when I don't agree with what they are telling me.
Autonomy	The vet seems to think I know what is best for my farm.
Autonomy	The vet is interested in helping me solve my problems my own way.

5.2.4 Assessment of code attribution

Audio files were coded by this author (Bard) who attended training in June 2015 the MITI 4 (Moyers, Manuel and Ernst, 2014) with authors Moyers and Ernst to enhance accuracy. Intra-coder reliability was assessed through double-coding each audio file to determine if mean verbal behaviour codes were proportionally different.

5.3 Results

Consultations lasted an average of 11.2 minutes (range 7.7 to 14.9).

5.3.1 MITI 4 Behaviour counts

Analysis of conversations using the MITI 4 (Moyers, Manuel and Ernst, 2014) indicate that no veterinarian performed at a level considered 'fair competency' with regards to question:reflection ratio (goal: 1:1). Reflections were not present in six of the fifteen veterinarian-'farmer' interactions. Two veterinarians achieved 'fair competency' in complex reflection percentage, achieving 50% and 75% respectively (competency goal set at 40% of total reflections). Complex reflections did not occur in the 13 other veterinarian-'farmer' interactions. Total MI -inadherent behaviours (126) far exceed total MI-adherent behaviours (15). Veterinarians predominantly relied on persuasion, questions and giving information in their consultation approaches (Figure 5-1). Total and mean summary figures for each category are presented in Table 5-3.

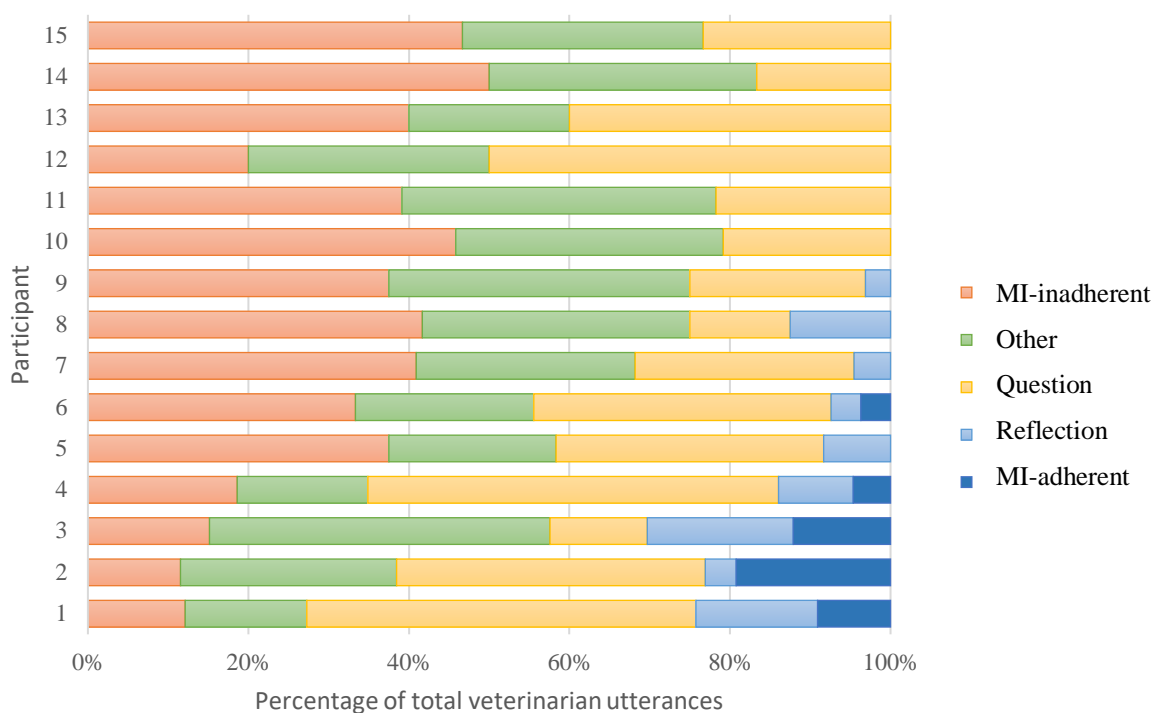


Figure 5-1. Proportion of total veterinarian utterances attributed to each Motivational Interviewing Treatment Integrity Code (MITI 4; Moyers, Manuel and Ernst, 2014) verbal behaviour code in role-play consultations (n=15)

Table 5-3. Total and mean Motivational Interviewing Treatment Integrity Code (MITI 4; Moyers, Manuel and Ernst, 2014) behaviour count frequencies in role-play consultations (n=15)

Group	Behaviour	Total count	Mean per interaction
MI-adherent	Affirm	5	0.3
	Seek collaboration	6	0.4
	Emphasise autonomy	4	0.3
MI-inadherent	Persuasion	119	7.9
	Confront	7	0.5
Other	Giving information	89	5.9
	Persuade with permission	26	1.7
Questions	Question	129	8.6
Reflections	Simple Reflection	16	1.2
	Complex Reflection	6	0.4

5.3.2 MITI 4 Relational and technical competency

Analysis of mean relational and technical global scores (Figure 5-2) showed that one veterinarian of the fifteen met the criteria for ‘fair competence’ in MI; a mean score of 3.5 in relational globals (partnership and empathy) and a mean score of 3 in technical globals (cultivating change talk, softening sustain talk) was present. Mean technical global score was 1.7 (range 1.5- 3) and mean relational global score was 1.6 (range 1-3.5; Figure 5-2).

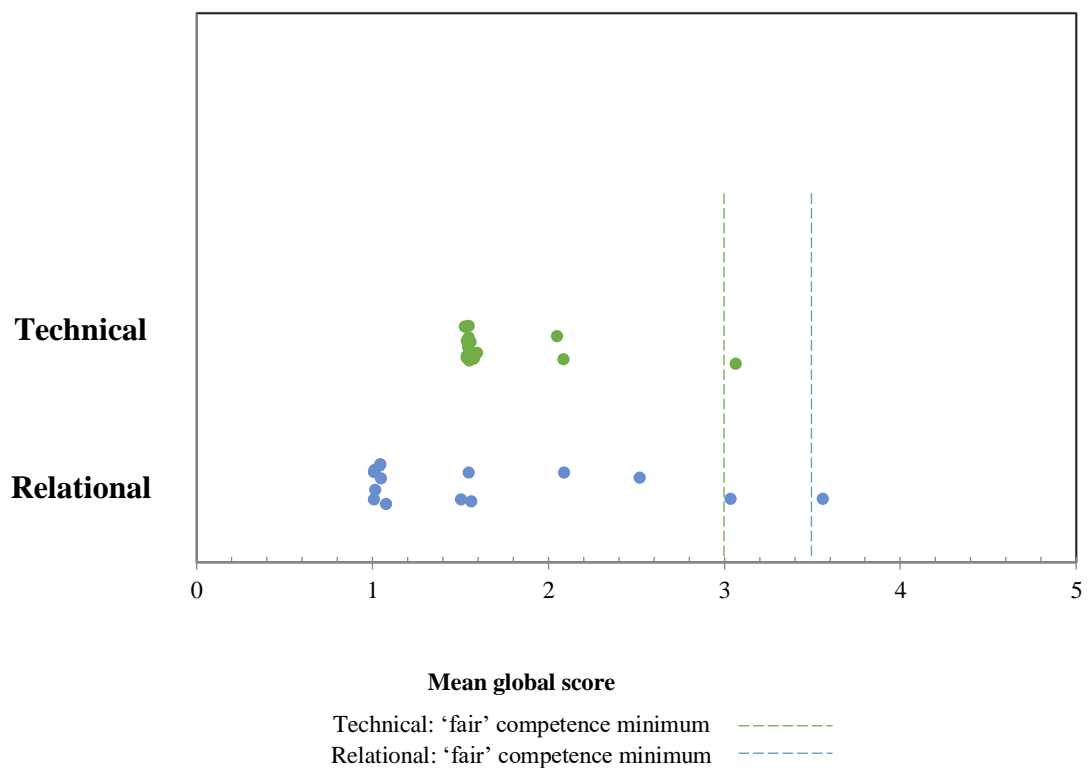


Figure 5-2. Distribution of veterinarian technical and relational global scores in MITI 4 role-play consultation analysis

5.3.3 MITI 4 individual global scores

Cultivating change talk

The scale for this variable is intended to measure *‘the extent to which the clinician actively encourages the client’s own language in favour of the change goal, and confidence for making that change’* (Moyers, Manuel and Ernst, 2014). Most veterinarians scored poorly in this global (mean 1.3, range 1- 3) with only three veterinarians achieving above the lowest threshold score. Low scores on this scale occur when *“the clinician is inattentive to the client’s language about change, either by failing to recognise and follow up on it, or by prioritising other aspects of the interaction (such as history-taking, assessment or nondirective listening)”* (Moyers, Manuel and Ernst, 2014). Most veterinarians focused the interaction on obtaining farm history/disease information, providing education as the primary veterinarian-‘farmer’ interaction, supplied reasons for change rather than encouraging them from the ‘farmer’, or missing change talk if it was offered. However, one veterinarian was more attuned to the language in favour of change expressed by the ‘farmer’ and received a score of three, although many change talk opportunities were still missed.

Softening sustain talk

This scale is intended to measure *‘the extent that the clinician avoids a focus on the reasons against changing or for maintaining the status quo’* (Moyers, Manuel and Ernst, 2014). Fourteen veterinarians scored at a level two in this global, with one at a three (mean score 2.1). Low scores in softening sustain talk are appropriate *‘when clinicians focus considerable attention to the barriers of change’*, choosing to *‘explore, focus on, or respond to the client’s language in favour of the status quo’* (Moyers, Manuel and Ernst, 2014). Veterinarians tended to ignore sustain talk, but their response to it - often using persuasive arguments of reasons the ‘farmer’ should change and how to do so - created a dynamic that often further entrenched and exacerbated the presence of sustain talk in response from the ‘farmer’, resulting in this low score attribution.

Partnership

This scale is intended to measure *‘the extent to which the clinician conveys an understanding that expertise and wisdom about change reside mostly within the client’* (Moyers, Manuel and Ernst, 2014). A low mean veterinarian score of 1.5 (range 1-4)

suggests veterinarians ‘*assume the expert role for a majority of the interaction and have a high degree of influence in the nature of the interaction*’ (Moyers, Manuel and Ernst, 2014). Veterinarians rarely surrendered the expert role, often sacrificed opportunities for mutual problem solving in favour of supplying knowledge or expertise and showed minimal querying of ‘farmer’ input (outside of history taking on the disease issue). However, one veterinarian scored greater than a two, and was able to foster collaboration and power sharing so that the contributions made by the ‘farmer’ impacted the session in a meaningful way.

Empathy

This scale is intended to measure the extent to which ‘*the clinician understands or makes an effort to grasp the client’s perspective and experience, and should not be confused with sympathy, warmth, acceptance, genuineness, support, or client advocacy*’ (Moyers, Manuel and Ernst, 2014). Veterinarians received a low mean score in this global (1.7), although more variation was witnessed than other scores (range 1-4), with two veterinarians scoring three and one scoring four. As such, whilst most veterinarians (n=12) gave little attention to the perspective of the ‘farmer’, asking mainly information seeking questions, a small proportion (n=3) actively tried to understand the ‘farmer’ and showed evidence of accurate understanding of her world view.

5.3.4 Client response: MIMSI and MITI correlation

Analysis indicated a statistically significant positive correlation between veterinarian use of reflections and the sense of autonomy support ($(r_s(15)= 0.58, p=0.02)$) and collaboration ($(r_s(15)= 0.62, p=0.01)$) experienced by the ‘farmer’. A statistically significant negative correlation was observed between veterinarian use of MI-inadherent behaviours (persuasion and confrontation) and the sense of evocation ($(r_s(15)= -0.58, p=0.03)$) experienced by the ‘farmer’.

5.3.5 Feasibility of MITI 4

5.3.5.1 Code attribution

Visual observation of mean score per MITI 4 (Moyers, Manuel and Ernst, 2014) category suggests agreement between the first and second scoring for behaviour codes (Figure 5-3) and global scores (Figure 5-4). Given this unique application of MITI 4 (Moyers, Manuel and Ernst, 2014), sharing the coding with a second individual was not possible at

the time of analysis (2015), nor was it possible to carry out sophisticated tests of intracoder reliability given the small number of data points. The coding process was of significant value to allow comment on current veterinarian skill, client response and intervention recommendations, but a more comprehensive exploration of coding validity would be necessary for an intervention study.

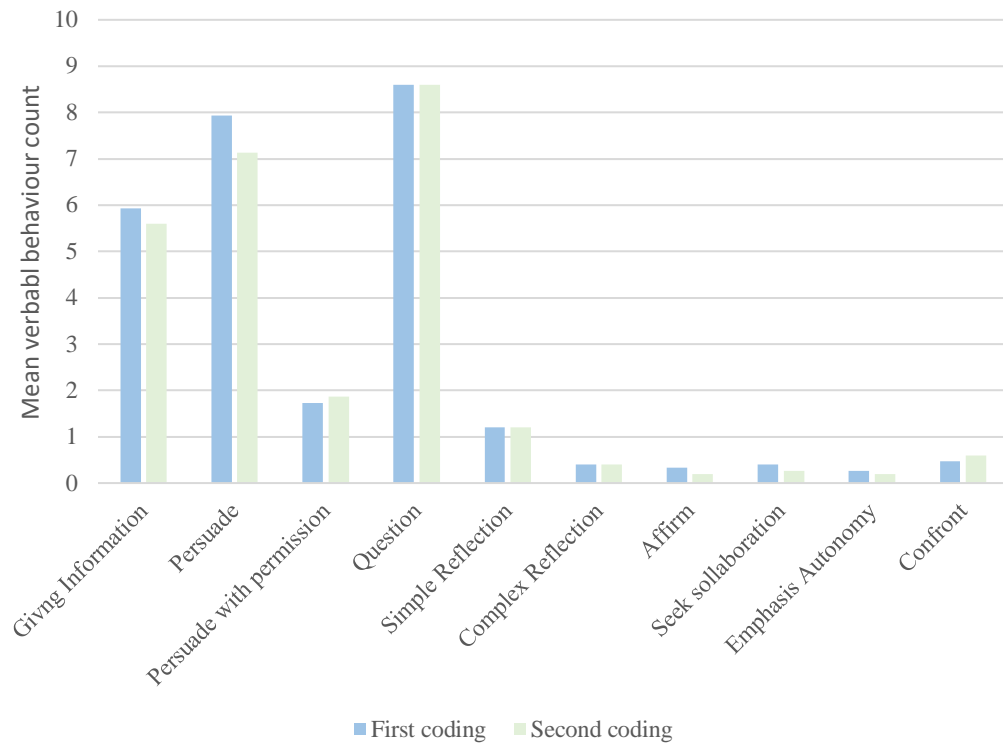


Figure 5-3. Mean Motivational Interviewing Treatment Integrity Code (MITI 4; Moyers, Manuel and Ernst, 2014) verbal behaviour codes on first and second coding of veterinarian and actress role-play communication samples (n=15)

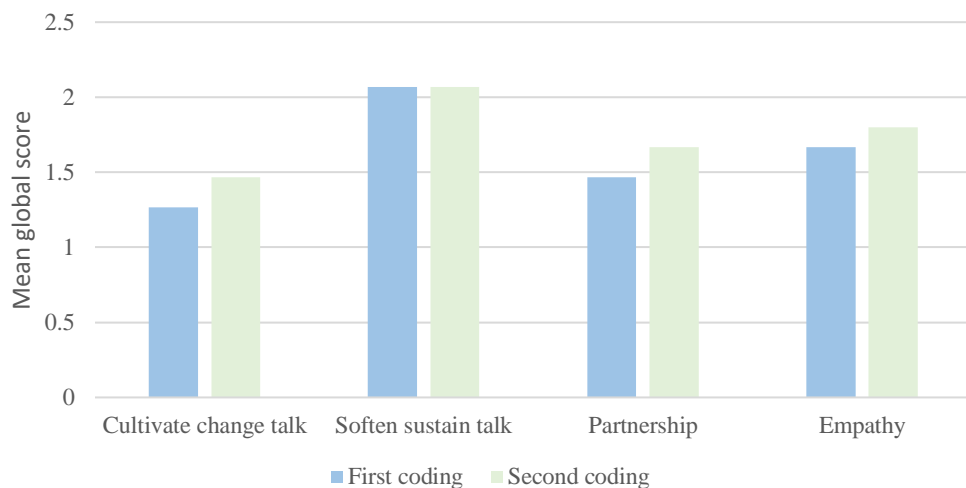


Figure 5-4. Mean Motivational Interviewing Treatment Integrity Code (MITI 4; Moyers, Manuel and Ernst, 2014) global scores codes on first and second coding of veterinarian and actress role-play communication samples (n=15)

5.3.5.2 *Data utility*

Organising and reviewing coded data was straightforward, with summary MITI 4 (Moyers, Manuel and Ernst, 2014) data offering the opportunity in an intervention study to compare differences in verbal behaviour summary counts and global score thresholds between control and treatment training groups (as in a multitude of previous studies including Persson *et al.*, 2016; Woelber *et al.*, 2016; Allicock *et al.*, 2017). The coding experience did, however, highlight that many areas that were poignant when listening to the consultation processes unfold were not captured using this coding scheme; namely, (i) client change language; (ii) the temporal relationships between veterinarian and client verbal behaviour; and (iii) durations of verbal behaviours. A record of these elements would have contributed more detail and nuance to the analysis process and enhanced data utility.

5.3.5.3 *Applying the coding scheme*

Employing the MITI 4 (Moyers, Manuel and Ernst, 2014) in the coding of veterinary consultations was straightforward for behaviour counts and global scores of empathy, partnership and cultivating change talk. The final global – softening sustain talk - created concern over accuracy. This global intends to measure ‘*the extent that the clinician avoids a focus on the reasons against changing or for maintaining the status quo*’. This definition created difficulties for the coding process, as veterinarians certainly avoided a focus on the status quo, but their mechanism of doing so (‘pushing back’ with persuasion) entrenched and exacerbated the presence of sustain language. As a result, this led to a paradoxical outcome: veterinarians both avoided and encouraged sustain talk in their typical response to its occurrence. A low code was therefore attributed to this behaviour (global score 2) as veterinarians ultimately maintained focus on the *status quo* through this approach, but this was not without some uncertainty over the resulting validity of this global score.

5.4 Discussion

5.4.1 Current veterinary communication

Overall, both behaviour counts and global ratings suggest MI-consistent communication is lacking in veterinarians; no veterinarian met the basic level of ‘fair’ competence in MI in both globals and behaviour counts. Whilst this sample size is small (so generalisability of data is difficult) these findings reflect existing quantitative analysis of veterinary communication (Shaw *et al.*, 2004; Jansen, 2010; McArthur and Fitzgerald, 2013). Previous studies reveal that veterinarians show a heavy reliance on closed questions, minimal solicitation of client opinion, minimal use of empathy and a predominance of information giving and persuasion. The congruence of these data with wider literature suggests they are likely to be a meaningful reflection of current practice. Additionally, whilst the individual verbal communication skills of MI may appear simple in definition (Table 5-1), they are not easy to manifest in communication interactions (Miller and Rollnick, 2009). This finding is therefore also consistent with literature on the adoption of MI-consistent skills, where Miller and Rollnick (2009) explicitly indicate that it is difficult for practitioners to find their way intuitively and naturally to the MI communication approach without specific training experience. Hence, it would be unrealistic to expect veterinarians to naturally exhibit competence in this methodology. As such, these data - in combination with wider veterinary and MI literature - support the assertion that veterinarians could benefit from training in the MI methodology to enhance verbal communication in the pursuit of behaviour change. Indeed, this enhanced communication would also meet the desire expressed by veterinarians and farmers to have a solid relational foundation underpinning their communication interactions, as their cultural script is one of shared understanding and collaboration (Chapter Four).

Despite a lack of overall competence in utilising MI-consistent skills, veterinarians did display the capacity to use individual MI-consistent verbal behaviours such as simple and complex reflections, in addition to using language associated with emphasising autonomy, seeking collaboration and affirming client strengths. For example, veterinarians emphasised choice over decision making:

Vet “So there’s other places that one can invest on a farm though and particularly at the moment it’s difficult...but if you feel this is an area that’s worth investing in, I’m certainly prepared to give some time to try to help you.”

identified and affirmed client strength:

*Vet “I’ll probably watch you milking and things but, you know, **you’re experienced, you’ve been working with cows for a long time.** What sort of things do you think might be worth doing?”*

and used complex reflections to convey understanding and empathy:

Actress “‘Yeah. I think what you’re saying is very good. I’m just thinking in my head ‘Oh my God!’ ” [laughs]

*Vet “It’s.... it’s one other thing that I’m trying to get you to do on top of all the other things that I’m trying to get you to do.....with mastitis and that sort of thing. **So it does become a bit... a bit overwhelming.**”*

Simple reflections were most readily expressed and were most often very short, concise expressions that mimicked the content of previous ‘farmer’ speech. This type of vocal mimicry in vocal communication is suggested by Rueff-Lopes and colleagues (2015) to be a result of emotional contagion - the tendency to automatically mimic the vocalisations of another person and, through afferent feedback, to converge emotionally. Indeed, mimicry is well recognised as a mechanism by which communicators convey pro-social intention (Otterbacher *et al.*, 2017). The place of this mimicry as a natural component of the veterinarian skill is not unexpected, as it is enmeshed within an emotional contagion process that is ‘*the basic block of social interactions*’ (Rueff-Lopes *et al.*, 2015). In this dataset, the more complex skills of (non-mimic) simple reflections and complex reflections, requiring conscious processing, were witnessed less commonly. However, two veterinarians were able to form complex reflections, suggesting this skill can manifest naturally in advisory encounters.

The occurrence of specific verbal behaviours of emphasising autonomy, seeking collaboration and affirming client strengths suggest a recognition of important psychological principles by veterinarians that employed them - namely, the need for the ‘farmer’ to feel a sense of choice, self-efficacy and relatedness to the advisor in an advisory interaction (Ryan and Deci, 2000). It is promising that these skills appeared spontaneously, suggesting their explicit articulation is not at odds with the delivery of herd health advice. However, the relative paucity of their occurrence compared to the more directive behaviours of giving information and persuasion evidence a compelling need for further training in adopting this verbal skill set.

Correlation results between the MITI (Moyers, Manuel and Ernst, 2014) and MIMSI (Miller *et al.*, 2008) also offer support for the training of veterinarians in the use of MI-consistent behaviours. The MIMSI (Miller *et al.*, 2008) scores attributed to each consultation by the ‘farmer’ suggest that she perceived a greater sense of choice and collaboration when reflective listening statements were used by veterinarians. Whilst many of these statements were founded on mimicry, even this simple reflective behaviour creates positive affiliation, rapport and liking between individuals (Lakin *et al.*, 2003) and an enhanced sense of interpersonal closeness in a relationship (Stel and Vonk, 2010). This is likely due to reflections acting as a critical component in the expression of accurate empathy (the ability to understand a client’s situation, perspective and feelings and communicate that understanding; Coulehan *et al.*, 2001), a relational capacity that accounts for a meaningful proportion of variance in treatment outcomes and therapeutic alliance (Moyers and Miller, 2013). The relationship between reflections and client engagement is therefore theoretically sound and encourages the further embedding of this skill via training, particularly given the absence of this verbal behaviour in six of the 15 consultations analysed.

The ‘farmer’ also reported feeling as if her ideas contributed more meaningfully to the session the less that veterinarians used persuasion and confrontation to assert their advisory message. It is possible this association stemmed from the relationship between persuasive communication and psychological reactance (Dillard and Shen, 2005), where the autonomy-threatening nature of persuasion makes it more likely to elicit sustain talk and client reactions against a behaviour rather than in favour of it (this relationship was witnessed during the coding process, as described in 5.3.5.3). The ‘farmer’s perception of being able to express her ideas on change was therefore likely to be divorced from more persuasive encounters, where she was more likely to be engaged in sustain talk arguments.

As the ‘farmer’ was blind to our intentions with the MIMSI measurement, these data indicate that MI skills engender something meaningful for client experience in interactions on the topic of herd health. Combined with the dearth of MI-consistent skills in overall communication style, these data support the place of an MI training intervention for cattle veterinarians for herd health advisory discussions.

5.4.2 Feasibility of MITI 4: Recommendations for intervention and actions taken

In addition to exploring the MI adherence of current veterinary communication for herd health, this chapter sought to determine recommendations for applying MITI 4 (Moyers, Manuel and Ernst, 2014) coding in an MI training intervention in the herd health paradigm. Through the process of data coding, analysis and write up, a variety of recommendations were noted that would enhance the validity, reliability and richness of data in future work in this thesis; (i) recording ‘real world’ data; (ii) coding for farmer language; (iii) establish an analytical process that (A) facilitates the recording of durations of behaviour and (B) facilitates the recording of verbal sequences; (iv) assess and/or/enhance reliability of coded data and (v) further explore the sustain talk global score and issues pertaining to assessment. Further details of these recommendations are provided below, in addition to the action taken to address these recommendations, which informed and enhanced the subsequent feasibility study of cattle veterinarian communication (Chapter Six) presented in this thesis.

5.4.2.1 *Record ‘real world’ data*

Recommendation: Data analysed for this feasibility assessment were a convenience sample (Chapter Three), but the collection and analysis of naturally-occurring data would ensure that the underlying complexity in ‘real world’ encounters was represented. Firstly, it is important to accurately portray the veterinarian-farmer relationship, where part of what allows advice to manifest meaning is its enactment within the ‘cultural script’ of advice giving on farm (i.e. one of informality, underpinned by relational factors; Chapter Four). Secondly, attention must be paid to the human-animal relationship, the quality and nature of which engenders differing practices and attitudes (Holloway, 2001) that would be anticipated to equip farmers with a proclivity towards certain perceptions, attitudes, motivations and actions. For example, Bertenshaw and Rowlinson (2015) have shown that an individualised farmer-cow relationship is associated with increased milk yield, suggesting differing farmer-cow relationships have the propensity to affect farmer management behaviour. The contribution of these features to the foundation of a discussion, whilst difficult to quantify, may influence delivery and response to advice in consultation dialogue. Indeed, Decker and colleagues (2013) suggest that MI practitioners tend to use more advanced MI strategies in role-play scenarios, whilst ‘real’ clients tend to show greater motivation at the beginning of a session, more discussion of unrelated

topics and greater alliance with the advisor. As such, treatment integrity assessment is likely to be a stronger representation of further practice when assessment is also carried out on a ‘real’ encounter.

In addition to enhancing the validity of the data by placing an MI intervention within these boundaries, a ‘real world’ data analysis strategy would allow further comment on what is most unique about this study; whether veterinarians are able to apply MI in the complex farm advisory environment, which often occurs outside, in all weathers and conditions, during the examination, treatment and moving of cattle (Moyers, personal communication 2015). To the author’s knowledge, this novel application of MI methods to a such a changeable advisory environment is the first study of its kind.

Action: To meet the demands of collecting ‘real’ consultation data, the feasibility study was designed to allow veterinarians to record a consultation of their choosing on ‘any change for the benefit of herd health’ (as stated in study information sheets) before and after the training experience. This process ensured that veterinarians were able to submit consultations for coding that reflected their typical advisory interactions, encompassing established veterinarian-farmer relationships and the myriad complexities of the on-farm consultation setting.

5.4.2.2 *Code for farmer language to support consultation analysis*

Recommendation: The need to pursue a coding strategy to record farmer language was identified, to allow analysis to determine not only whether patterns in veterinarian communication are altered following MI training but also whether MI-consistent or MI-inconsistent verbal behaviour have a measurable effect on farmer response (whether temporal or correlational). Previous MI literature has evidenced a causal chain between advisor behaviour, client change talk and behavioural outcomes of MI sessions (Miller and Moyers, 2017), therefore these associations add nuance and depth to MI session analysis. In this feasibility assessment, the MITI 4 (Moyers, Manuel and Ernst, 2014) alone was applied as a reliability and validity assessment of integrity, given evidence of a correlation between the cultivating change talk global and the occurrence of change talk (Moyers et al. 2016), enabling this global to act as a proxy for expression of ‘farmer’ change language. However, in reporting these results, the lack of representative data on ‘farmer’ change language was felt to negatively impact the potential to accurately represent and discuss this verbal feature within role-play consultations.

Action: To record farmer change language throughout consultations, the Client Language Assessment in Motivational Interviewing (CLAMI) Segment (Miller *et al.*, 2008) was chosen to use in combination with the MITI 4 (Moyers, Manuel and Ernst, 2014)(Chapter Six). This segment ‘*has been designed to be compatible and fit with other coding systems from [The Centre on Alcoholism, Substance Abuse and Addictions] research group, such as the MITI*’ (Miller *et al.*, 2008), and intends to capture the frequency, type and intensity of client language in an MI session. The combination of these two codes has been applied in other MI research interventions (Flickinger *et al.*, 2013; Öserlund Efraimsson *et al.*, 2015; Josephson, 2016; Beach *et al.*, 2018) and when combined are reported to be practical and achieve good reliability (Flickinger *et al.*, 2013).

5.4.2.3 *Establish an analytical process that (A) facilitates the recording of durations of behaviour and (B) facilitates the recording of verbal sequences*

(A) Recommendation: An analytical process that enabled the duration of verbal behaviours to be examined needed to be found, given that the relative durations of veterinarian behaviours within utterances were striking; namely, those of persuasion and giving information were noted to be of far greater duration than other codes. As such, it was felt that the attribution of one ‘code’ for all veterinarian verbal behaviours hid the relative weight of a bout of information giving or persuasion, as noticed by Flickinger and colleagues (2013) in their analysis of healthcare providers: ‘*a single “giving information” code for a paragraph of provider speech may not fully convey the patients’ burden of information overload*’. Additionally, the proportion of time each party contributed to the consultation also emerged as a variable of interest, with veterinarians tending to speak for considerably longer during speech volleys, but this was impossible to discern from tally data. Being able to report these durations would allow more sophisticated discussion of veterinarian and ‘farmer’ contributions to the consultation, such as the propensity for consultations to mirror a guiding or directive style.

(B) Recommendation: Existing research on the active mechanisms underpinning the efficacy of the MI methodology has sought to determine temporal relationships between practitioner and client verbal behaviour, with success in defining causal pathways between these behaviours (Miller and Moyers, 2017). These advances represent a strengthening of the evidence base behind the practice and efficacy of the methodology; the inclusion of examining temporal relationships in an MI intervention for cattle

veterinarians would similarly add strength to the exploration of MI skill within this context, whilst also facilitating the prescription of specific verbal behaviours for communication on behaviour change. Recording individual verbal behaviours in sequence would also facilitate the use of tests of intra-observer reliability, given the ability to assess coding for comparable point-by-point reliability (of particular use if data are similarly coded by one observer).

Action: To achieve the analytical goals of recording durations and temporal sequences of speech in MI interactions, Klonek, Quera and Kauffeld (2015) proposed that researchers should rely on computer-supported coding mechanisms, given their ability to automatically record time and sequential information whilst leaving observers to focus only on coding the functional aspects of the interaction. Indeed, this benefit was recognised by MITI and CLAMI authors at The Centre on Alcoholism, Substance Abuse and Addictions (CASAA), whose desire to facilitate moment-to-moment parsing and sequential coding inspired the development of the CASAA Application for Coding Treatment Interactions (CACTI) software to meet these demands (Glyn *et al.*, 2012).

In an investigation of coding the MITI 4 (Moyers, Manuel and Ernst, 2014) using (i) computer-assisted software coding and (ii) paper-pencil coding, Klonek, Quera and Kauffeld (2015) evidenced equivalence in reliability estimates, in addition to slightly higher agreement for most codes using software estimates (attributed to the ability to revisit and recode specific events in verbal streams without having to review an entire session). Additionally, Klonek, Quera and Kauffeld (2015) specifically highlighted the capacity to use this approach to combine different coding instruments for clients and interviewers to analyse interactional dynamics, as desired for the herd health advisory paradigm.

As a result, the Noldus Observer (Noldus Information Technology, 2018) behavioural interaction software was chosen to code consultations using the MITI 4 (Moyers, Manuel and Ernst, 2014) and CLAMI (Miller *et al.*, 2008) to enable recording of durations and behavioural sequences. This software package was chosen given its capacity to effectively code communication interactions (Noordman and van Dulmen, 2013; Sep *et al.*, 2014; Slort *et al.*, 2014) combined with extensive personal experience of this author (Bard) with the software. As a result of using this package, it was also possible to compute

Cohen's Kappa on a subsection of double-coded consultations using sequential data outputs, to add further insight into the repeatability of coding decisions.

5.4.2.4 *Assess and/or enhance reliability of coded data*

Recommendation: To enhance the reliability of output data, ideally a pooled sample of codes from more than one observer would be used in the intervention study (Moyers *et al.*, 2016). If sharing coding with a second individual is not a possibility (as in this exploratory study), a coding technique that would enable more sophisticated analysis on intra-coder reliability should be used. For example, sequential coding of communication behaviours would facilitate a Cohen's Kappa analysis of double-coded samples (Bakeman and Quera, 2011) to evaluate individual coder consistency.

Action: As all coding was completed by this author (Bard), coding validity was tested in two ways in advance of analysis statistically. First, as a measure of point-by-point reliability for sequentially coded data, an event-based Kappa coefficient was calculated using GSEQ 5.1 (Bakeman and Quera, 2011) based on a sub-sample of double coded consultation files (n=4, >10% total observation time; 52 minutes of 490 minutes total). Codes were matched utterance by utterance using an alignment algorithm implemented in GSEQ 5.1 (Bakeman and Quera, 2011). Second, the non-parametric data on veterinarian global scores were analysed statistically using Spearman's rank correlation (using SPSS Version 23; IBM Corp., Armonk, NY) to determine if theoretically meaningful associations existed in coding attributions between MITI 4 (Moyers, Manuel and Ernst, 2014) veterinarian verbal and global MI measures.

5.4.2.5 *Further explore sustain talk global and issues pertaining to assessment*

Recommendation: This coding experience highlighted issues in the adaptation of the softening sustain talk global in this context; namely, the paradox that veterinarians both avoided and encouraged sustain talk in their typical response to its occurrence. Further discussion with other coders and (if possible) MITI 4 (Moyers, Manuel and Ernst, 2014) authors would encourage a better understanding of this global measure and its application in the full intervention coding process.

Action: With regards to the issues found in applying the softening sustain talk global measure - namely, the paradox that veterinarians both avoided and encouraged sustain talk in their typical response to its occurrence - consultation was sought with a variety of

coders. First, a visit to the Motivational Interviewing Coding Lab Stockholm (MIC Lab, 2018) run by Motivational Interviewing Network of Trainers (MINT: <http://motivationalinterviewing.org/>) member and MI researcher Dr. Lars Forsberg allowed discussion of core coding issues. Individual role play consultation files were assessed with two other experienced coders to allow discussion of code attribution and issues faced in analysing the veterinary herd health context.

Discussion on the softening sustain talk global indicated that the MICLab (MIC Lab, 2018) had also struggled with the attribution of this code and had tended to attribute a score of four in analysis of their ‘real’ consultations, as the overuse of directing was present but did not necessarily manifest a spontaneous increase in sustain talk. Instead, overuse of this directing often meant the veterinarian’s dominance in speech tended to eliminate the farmer’s opportunity to respond. Given that ‘real’ clients may show greater alliance with the veterinarian than those in role-play (Decker *et al.*, 2013), this difference in the interaction dynamic of sustain talk might to some extent be a result of the feasibility coding focusing on role-play consultations. However, this contrasting approach still required further clarification to ensure coding decisions were made reliably in the face of a complex global score.

In response to this coding conflict, Dr. Lars Forsberg sought personal communication with MITI 4 (Moyers, Manuel and Ernst, 2014) author Denise Ernst (2017) who noted:

“The [MITI coding] manual doesn't address the situation when the counsellor is using strategies (such as persuades or confronts) that are known to increase the likelihood of sustain talk. And [the counsellor] often just keep[s] going so that the client doesn't even have a chance to offer sustain talk. Of course, they are likely to score low in cultivating change talk, empathy and partnership in this case. It may be that the softening sustain talk is higher because there isn't any. An example of this would be the overuse of directing done by Steve [Rollnick] on the DVDs [widely used videos for MI training]. It has a 4 in softening sustain talk and 1s on the rest of the globals.

It would be lower in Softening Sustain Talk if they used those strategies in response to sustain talk. They would not get credit for avoiding it.

It is a difficult call. We have some issues with this global all the way around.”

The difference in code attribution was therefore not felt to be a cause for significant concern, given that the wider coding community had also struggled with attributing this global. To ensure sufficient accuracy for the intervention coding, a decision rule based on

Moyers and colleague's (2016) recommendations was established: '*in the absence of sustain talk, the clinician should receive a high rating (either four or five). This decision rule... yielded good reliability among raters*'. Where significant sustain talk occurred that could be clearly attributed to persuasive strategies, a lower code would be attributed as the veterinarian '*would not get credit for avoiding it [sustain talk]*' (Ernst, personal communication). These decisions led to a confident coding process.

5.5 Conclusion

Exploration of role-play veterinary consultations suggested that veterinarians do not currently utilise MI-consistent skills at a level of basic competency, indicating a need for further communication training to meaningfully employ the skills of this methodology. Whilst this is a small study sample (n=15), this result is consistent with wider literature in this context that suggests veterinary communication is predominantly underpinned by a paternalistic relationship (Shaw *et al.*, 2006) leading to a dearth of empathy, dominance of information giving and a veterinarian-led agenda (Jansen, 2010; McArthur and Fitzgerald, 2013). Additionally, whilst the individual verbal communication skills of MI may appear simple in definition, they are not easy to manifest in communication interactions (Miller and Rollnick, 2009). This finding is therefore also consistent with literature of the adoption of MI-adherent skills, where Miller and Rollnick (2009) explicitly indicated that it is difficult for practitioners to find their way intuitively and naturally to this communication approach without specific training experience.

Whilst the incidence of MI-specific skills within sample data was below the threshold for competency, these skills did occur spontaneously in several veterinarians, and their presence was significantly associated with client perception of autonomy and collaboration. This effect was witnessed in association with the verbal skill of reflections, a foundational skill of empathy argued by Moyers and Miller (2013) to be a critical component of successful behavioural outcomes. Indeed, veterinarians and farmers themselves recognise the influence of a relational understanding as the foundation for the advisory paradigm (Chapter Four), but at present struggle to translate this recognition from a mere relational identity to a realised aspect of communication. Training in the MI methodology could achieve this goal, whilst also facilitating greater farmer self-determination in the pursuit of herd health management change (Silva *et al.*, 2008).

Chapter Five – Investigation of current veterinarian MI skill and MITI 4 feasibility testing

As a result, a feasibility study to determine veterinarian capacity to learn an MI-consistent communication style and embed it in the unique advisory context of on-farm discourse was considered essential. Exploration of the MITI 4 (Moyers, Manuel and Ernst, 2014) suggested it was a useful coding tool to support the analysis of an intervention of this kind, albeit buttressed with additional coding strategies that also record farmer change language, the temporal relationships between veterinarian and farmer verbal behaviour and durations of verbal behaviours. These recommendations were realised in the feasibility study (Chapter Six) through the integration of the CLAMI (Miller *et al.*, 2008) code in the analytical strategy, with the behavioural interaction software Noldus Observer (Noldus Information Technology, 2018) supporting the coding process. Combined, these steps ensure that Chapter Six not only has the potential to shed light on whether veterinarians can learn and apply the MI methodology in herd health discussions, but also on the very characteristics of veterinary communication itself.

Chapter Six

A feasibility study of brief Motivational Interviewing training for
on-farm veterinary communication and sequential analysis of
veterinarian-farmer advisory exchanges

“The most difficult thing is the decision to act, the rest is merely tenacity”

Amelia Earhart

Abstract

Motivating clients to engage with veterinary advice remains a critical challenge to improving cattle health and welfare. Motivational Interviewing (MI) may offer the skills and ethos to connect with farm clients on topics of herd health and enhance outcomes on farm, with its propensity to meet a skills gap identified in current cattle veterinary communication (Chapters Three and Five) and its congruence with the herd health advisory paradigm (Chapter Four). This chapter presents the outcomes of a feasibility study examining the provision of brief MI training for cattle veterinarians to explore both the effect of this training on veterinarian and farmer language within the consultation and veterinarian perceptions of the utility of the training experience.

Practicing cattle veterinarians (n=14) attended brief MI training and recorded an audio file of advisory communication on '*any change for the benefit of herd health*' before and after the experience. Anonymised audio files (n=31) were analysed in Noldus Observer 5.0 using the Motivational Interviewing Treatment Integrity code to capture veterinarian advisory communication behaviour and the Client Language Assessment in Motivational Interviewing code to capture farmer change language.

Statistical analysis of pre- and post-training communication data indicated a brief MI training experience led to a significant increase in veterinarian use of MI-consistent skills, a significant decrease in veterinarian use of MI-inconsistent skills and a significant increase in farmer language on the positive of change (change talk). Sequential statistical analysis (GSEQ. 5.0) of temporal communication data also supported the causal chain hypothesised within MI, namely that those verbal behaviours that are especially consistent with MI (such as seeking collaboration, emphasising autonomy and affirming) are likely to increase the probability of client change talk, whilst those in that are inconsistent with MI (such as persuasion) are likely to increase the probability of sustain talk.

6.1 Introduction

Motivational Interviewing (MI) is a collaborative, empathic and evocative conversation style developed in the medical sciences for strengthening a person's own motivation to change (Miller and Rose, 2009). The application of MI to the herd health advisory context (and veterinary realm in general) is unresearched, yet existing herd health communication data suggest cattle veterinarians are not naturally proficient in the MI methodology. Veterinary consultations on herd health (n=17, mean duration 96 minutes) studied by Jansen (2010) suggest a paternalistic approach in interactions, with minimal evocation of farmer opinion, dominance of closed questions and minimal collaboration on the consultation agenda. Additionally, the foundational skill of reflection in MI - 'paraphrasing farmer expressions to ensure mutual understanding' - was entirely absent, suggesting deficits in the promotion of empathic understanding of client perspective and emotion (Rogers, 1986; Moyers, 2014). Initial exploration of verbal behaviour in the pursuit of change (Chapters Three and Five) echoed these data, with veterinarians carrying out role-play consultations on lameness and mastitis communicating in a directive style that failed to meet competency thresholds for MI proficiency (Moyers *et al.*, 2016).

Role-play data (Chapter Three) does however offer optimism, given veterinarians' attempts in these interactions to foster empathy through the symbolic meaning of offering instrumental support, attention on cultivating trust through emphasising the virtue of their ability and explicitly referring to farmer concerns (such as milk price) in context; these features all suggest a desire to connect relationally with farmers in communication. In interview data (Chapter Four), both veterinarians and farmers similarly highlighted the importance of relational factors such as interpersonal trust and a shared understanding in the advisory role on farm, in addition to emphasising mutualistic communication as desirable (despite veterinarian recognition that these attributes were not always delivered consistently).

In consequence, whilst a communication skills deficit is recognised, Chapters Three and Four suggest that veterinarians may already be motivated to create a relationship-centred advisory environment but may lack specific training in appropriate communication skills. For example, it is well recognised that MI communication skills are not easy to manifest in communication interactions without specific training experience (Miller & Rollnick,

2009), meaning cattle veterinarians' difficulty in advancing from these forms of relational intent to exhibiting communication behaviour that exemplifies collaboration, empathy and evocation is to be expected. Cattle veterinarians may also be influenced by the paternalistic identity of the veterinarian (an expert, paid to provide a service of advice and solutions) which may shape advisory recommendations into the directive language and structure with which they are delivered (Chapter Three).

Training in MI - involving specific and focused attention on cultivating mutualistic, relationship-centred communication behaviours coupled with a technical focus on change language and processes - could enhance communication on behaviour change and help realise the relational paradigm desired in herd health advice. More broadly, the MI methodology also enacts the core components of Self-Determination Theory (Ryan and Deci, 2000), a conceptualisation of behaviour change and motivation that, despite promising evidence of efficacy in intervention approaches, is at present underutilised and unexplored in the veterinary sciences. Given the known challenges in promoting on-farm change (Whay and Main, 2015; Ruston *et al.*, 2016), MI represents both a timely and apt intervention for the enhancement of the herd health advisory paradigm.

At present, there has been no empirical exploration of the capacity for the veterinary profession to adopt the MI methodology, nor qualitative exploration of veterinary perceptions of training and adoption of this methodology in the herd health advisory paradigm. Informed by the recommendations detailed in Chapter Five, this chapter therefore presents a feasibility trial of MI training for cattle veterinarians to quantitatively explore (i) *The training effect*: whether brief training in MI leads to a meaningful change in veterinarian communication on behaviour change and farmer change language; (ii) *Association*: whether MI-consistent, MI-inconsistent or MI-neutral behaviours are associated with specific types of farmer language; and (iii) *Temporal relationships*: whether veterinarian communication behaviours influence subsequent farmer speech in discussions on behaviour change. This quantitative exploration is supported by qualitative data on the veterinarian experience of brief training in MI, where data drawn from an open-ended questionnaire clarified veterinarian perceptions of the applicability of skills on farms, the training experience, the financial value of the course and the utility of the method to cattle veterinarians.

6.1.1 Training effect

The first aim of this study was to investigate the effect of brief training in MI with practicing cattle veterinarians. This was to answer four research questions:

1. Does brief training in MI significantly increase behaviour that is consistent with MI?
2. Does brief training in MI significantly decrease verbal behaviour that is inconsistent with MI?
3. What effect does brief training in MI have on farmer language?
4. Is brief training in MI sufficient for veterinarians to acquire basic competency in the MI methodology? (As defined by the Motivational Interviewing Treatment Integrity code: MITI 4; Moyers, Manuel and Ernst, 2014).

6.1.2 Association

The second aim of this study was to investigate the association of veterinarian verbal behaviour with farmer verbal behaviour. This was to answer three research questions:

1. Is there a significant association between MI-consistent verbal behaviour and farmer response?
2. Is there a significant association between MI-inconsistent verbal behaviour and farmer response?
3. Is there a significant association between MI-neutral behaviour and farmer response?

6.1.3 Temporal relationships

The final aim of this study was to investigate the transitions between veterinarian and farmer language during discussions on behaviour change for herd health. Three research questions guided analysis:

1. Veterinarian to farmer transitions: do MI-consistent behaviours lead to change talk and do MI-inconsistent behaviours lead to sustain talk?
2. Veterinarian to farmer transitions: are specific veterinarian verbal behaviours more likely to lead to commitment change talk?
3. Farmer to veterinarian transitions: how do veterinarians respond to farmer change talk, neutral language and sustain talk?

6.1.4 Veterinarian perceptions of brief training

The final aim of this study was to investigate veterinary perceptions of the training experience. Five research questions guided the design of the questionnaire (Appendix 9):

1. What learning outcomes would veterinarians report from brief training in MI?
2. What skills would veterinarians report as effective or ineffective with their clients?
3. What would veterinarians like and dislike about the training experience?
4. How much financial value would veterinarians attribute to the training experience, in terms of the amount of their continuing professional development (CPD) budget they would be willing to allocate?
5. Would veterinarians judge the training experience as worthwhile for other veterinarians to complete and why?

6.2 Materials and Methods

6.2.1 Study participants

Six practices and one regional veterinary group (veterinarians n=60) were recruited to take part in an MI feasibility study exploring the effect of brief MI training on veterinary communication and farmer engagement. Participating practices received two training sessions on the MI methodology via their ‘clinical clubs’ (lasting one to two hours per session) whilst the regional group of veterinarians received one full day of training (approximately five hours). To allow analysis of veterinarian and farmer language, veterinarians were asked to record a consultation with a farm client on ‘any change for the benefit of herd health’ before and after training (for example, when providing advice on lameness management). To allow exploration of veterinary perceptions on the MI methodology and training experience, veterinarians were also asked to fill in a questionnaire (approximately) two weeks after the training experience (Appendix 9). Veterinarian practices/groups were a convenience sample, recruited by email, telephone or face-to-face interactions from practices or via individuals known to the research team and agreeing in principle to this study protocol.

6.2.2 Training protocol

Participants in both practices and regional veterinary groups followed a training protocol designed by this author (Bard), who is a member of the Motivational Interviewing Network of Trainers (MINT: <http://www.motivationalinterviewing.org/>). The training provided was a mixture of didactic presentation and demonstration, dyadic or small group experiential exercises, video observation and group feedback/discussion covering core elements of MI (Figure 6-1; indicating split of topics when training was delivered in two sessions). Given the brief nature of training, participants were provided with veterinary-specific MI training notes to refer to following the session (Table 6-1) with summary pages, rules of thumb and ‘cheat sheets’ for incorporating the ideas into practice.

6.2.3 Ethics

This study was reviewed and approved by the University of Bristol Faculty of Medical and Veterinary Science Research Ethics Committee (ref 14261) ensuring procedures met ethical guidelines in place for research with human participants. An information sheet was supplied to participants detailing the aims of the research prior to data collection, with written consent to take part obtained.

6.2.4 Coding: Veterinarian verbal behaviour parameters

Veterinarian verbal behaviours were analysed using the Motivational Interviewing Treatment Integrity 4.2.1 code (MITI 4; Moyers, Manuel and Ernst, 2014). See Chapter Five for a description of coding parameters.

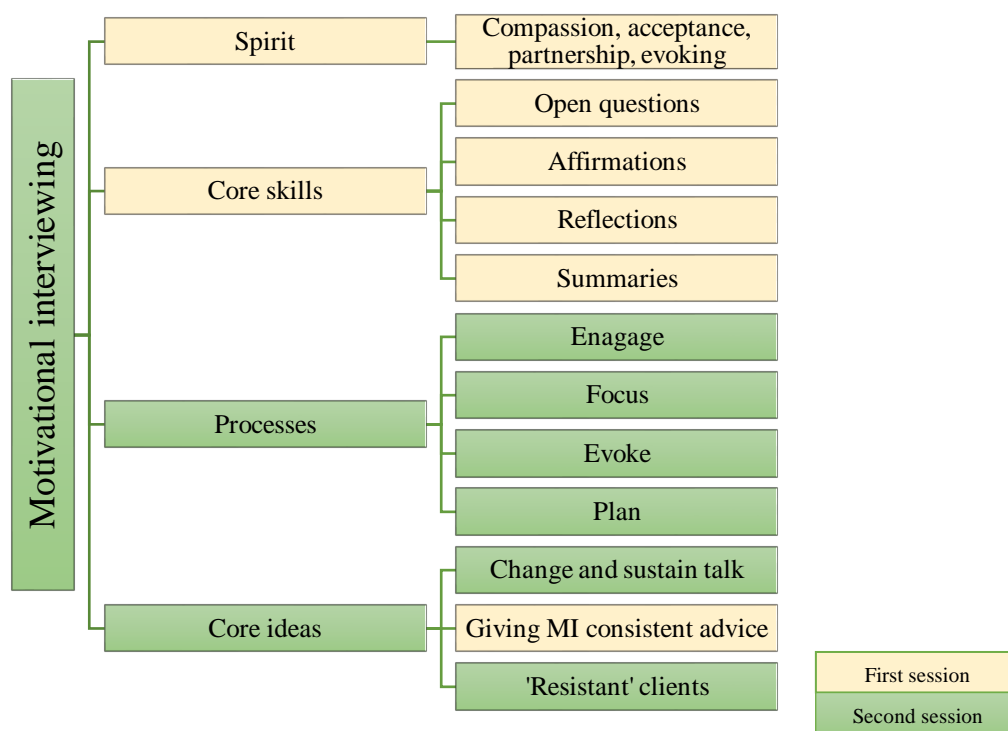


Figure 6-1. Topics covered during brief Motivational Interviewing training

Table 6-1. Content of training notes provided to veterinarians as part of brief Motivational Interviewing training

Notes	Overview of concepts
MI Spirit	Compassion, Acceptance, Partnership, Evocation Spirit: Rules of thumb
Core skills in MI	Open Questions Affirmations Reflections overview Simple and complex reflections Amplified reflection Double sided reflection Summaries Core skills: Rules of thumb Core skills: Reflection rule of thumb Core skills: cheat sheet
Four Processes	Engaging Focusing Evoking Planning Cheat sheet: What should I be thinking?
Core Ideas	Change talk and sustain talk Giving MI-consistent information and advice 'Resistant' clients The 'unmotivated' client
Keeping up skills	Options: websites, videos, books

6.2.5 Coding: Farmer verbal behaviour parameters

Farmer language was analysed using the Client Language Assessment in Motivational Interviewing (CLAMI) code (Miller *et al.*, 2008) to capture the frequency and type of client language about change. For verbal behaviours, discourse is broken down into volleys (uninterrupted segments of veterinarian speech) and coded for utterances (complete thoughts) reflecting change talk, sustain talk and follow/neutral (Table 6-2). Both change and sustain talk can be coded as reasons (subcodes desire, ability, need), other, commitment and taking steps. If codes occur multiple times per volley, only one count is recorded.

Table 6-2. Farmer verbal behaviour codes established in the CLAMI (Miller *et al.* 2008) reflecting change talk, follow/neutral and sustain talk

Farmer verbal behaviour	Brief description
Change talk	
Reason	Specific rationale, basis, incentive or justification for making the change
<i>Subcode: desire</i>	As above, containing words ‘want’, ‘desire’, ‘like’ or close synonym
<i>Subcode: ability</i>	As above, containing words ‘can’, ‘possible’, ‘willpower’ or close synonym
<i>Subcode: need</i>	As above, containing words ‘need’ or ‘must’ or close synonym
Taking steps	Concrete action(s) towards the change
Commitment	Agreement, intention or obligation towards the change
Other	Any language that clearly reflects movement towards change that is not captured by the other categories
Neutral	
Follow/neutral	No indication of farmer inclination either towards or away from change
Sustain talk	
Reason	Specific rationale, basis, incentive or justification away from making the change or to maintain the <i>status quo</i>
<i>Subcode: desire</i>	As above, containing words ‘want’, ‘desire’, ‘like’ or close synonym
<i>Subcode: ability</i>	As above, containing words ‘can’, ‘possible’, ‘willpower’ or close synonym
<i>Subcode: need</i>	As above, containing the words ‘need’ or ‘must’ or close synonym
Taking steps	Concrete actions away from the change or to maintain the <i>status quo</i>
Commitment	Agreement, intention or obligation away from the change or to maintain the <i>status quo</i>
Other	Any language that clearly reflects movement away from the change or to maintain the <i>status quo</i> that is not captured by the other categories

6.2.6 Coding: Consultation analysis

First, recorded consultations (n=31) were assessed for length. Those consultations exceeding 20 minutes were edited to retain only the final 20 minutes of the consultation for two reasons; firstly, this is the maximum coding time window recommended within MITI 4 (Moyers, Manuel and Ernst, 2014) due to diminished reliability of globals above this threshold. Secondly, sampling the last twenty minutes was proposed by Dr Lars Forsberg (2017, personal communication) of the commercial and research MI coding organisation MIC Lab Stockholm (MIC Lab, 2018) to offer the opportunity to capture comparable consultation segments, where change conversations are expected to similarly peak as the consultation draws to a close and momentum towards planning and action occur.

Consultation samples were pooled across treatments (pre-training and post-training) and their order randomised (using the RAND function in Microsoft Excel) so an anonymous code could be attributed to each. Data were imported under code name into Noldus Observer XT (Noldus Information Technology, 2018), an event logging software for behavioural interaction analysis. To enable analysis within the software package, an ethogram combining the MITI and CLAMI coding instruments was created, with each individual verbal behaviour set as a mutually exclusive state event. As sequences of verbal behaviour were also of interest in this study, a selection of codes were developed to additionally capture all ‘MI-irrelevant’ verbal behaviour (such as the veterinarian or farmer talking to the cow) to ensure no inaccuracies in verbal sequences were recorded where non-MITI or non-CLAMI behaviours also contributed to volleys of consultation dialogue/process (Table 6-3).

Table 6-3. MI irrelevant verbal behaviour codes constructed for communication data analysis

MI irrelevant behaviour	Brief description
Veterinarian/farmer irrelevant	Verbal behaviour that offers no insight or influence on the advisory topic under discussion
Veterinarian/farmer talk to cow(s)	Any cow directed verbal behaviour
Third party	Any third party interrupting the consultation
Cannot hear	Verbal behaviour is impossible to code due to background noise and/or recording quality
Moving cow(s)	Consultation disrupted by one or both parties moving a cow or cows
Veterinarian/farmer pause	Any break in veterinarian or farmer volley >3 seconds

Durations of verbal behaviour were additionally of interest, therefore extra codes were created to distinguish between the ‘first occurrence’ and a ‘repeat occurrence’ of a verbal behaviour code in a veterinarian or farmer volley. This ensured that total durations of any given code could be accurately summarised through combining ‘first occurrence’ and ‘repeat occurrence’ verbal behaviour codes, whilst frequency counts reflecting traditional MITI and CLAMI outputs (where only the first occurrence of a code in a volley contributes to the final tally) could be summarised by accounting for only ‘first occurrence’ behaviour codes. Complementing this quantitative coding, a detailed questionnaire recording the consultation change goal(s), consultation setting, qualitative MI elements (Spirit, Processes), broad veterinarian communication practice and aspects of farmer engagement was also created for completion after each consultation coding experience. This was used to create detail for personal reference during the analysis process.

MITI 4 (Moyers, Manuel and Ernst, 2014) global scores were completed on the first pass of the recording, whilst MITI 4 (Moyers, Manuel and Ernst, 2014) and CLAMI (Miller *et al.*, 2008) verbal behaviour coding was completed with a second pass. This process was chosen as MITI and CLAMI recording required stopping and restarting of the recording during the coding process, which is reported to disrupt the ability of the coder to form a gestalt impression for the global codes (Moyers *et al.* 2014). This stopping and restarting was a necessary component of coding given interest not only in the frequency of verbal behaviours, but also in their respective durations; durations could only be accurately calculated as an output with accurate parsing, which necessitated listening to volleys in full (or even sequences of volleys) prior to rewinding the recording and parsing accordingly. This allowed careful identification of start and stop points for utterances in addition to differentiating ‘first occurrence’ and ‘repeat occurrence’ behaviours within volleys.

6.2.7 Resultant variables for statistical analysis

Coding of verbal behaviour yielded a dataset that was unevenly distributed across categories. Given the small sample size, coded variables were collapsed across nine coding categories to increase analytical power (Figure 6-2) in accordance with Martin and colleagues’ (2005) recommendations on advisor verbal behaviour (MI adherent, MI inadherent, reflection, question, other) and Miller and colleagues’ (2008) recommendations on farmer verbal behaviour (change talk, sustain talk, follow/neutral),

Chapter Six– Brief MI training and sequential analysis of veterinarian communication and one category reflecting all ‘MI irrelevant’- coded behaviours specific to the on-farm context.

Additionally, four other MITI 4 (Moyers, Manuel and Ernst, 2014) variables were calculated for analysis as core measures of MI skill assessment: reflection to question ratio, per cent complex reflections, mean technical global (cultivating change talk /softening sustain talk) and mean relational global (empathy/collaboration). Finally, the proportion of consultation speech allocated to the veterinarian was calculated as an additional variable of interest, by combining durations across veterinarian and farmer codes respectively. This resulted in a total of 14 variables for inclusion in statistical analysis, to explore whether significant differences existed between pre- and post-training communication behaviours (using SPSS Version 23; IBM Corp., Armonk, NY) and to explore temporal transitions between communication behaviours (using GSEQ 5.1; Bakeman and Quera, 2011); Table 6-4).

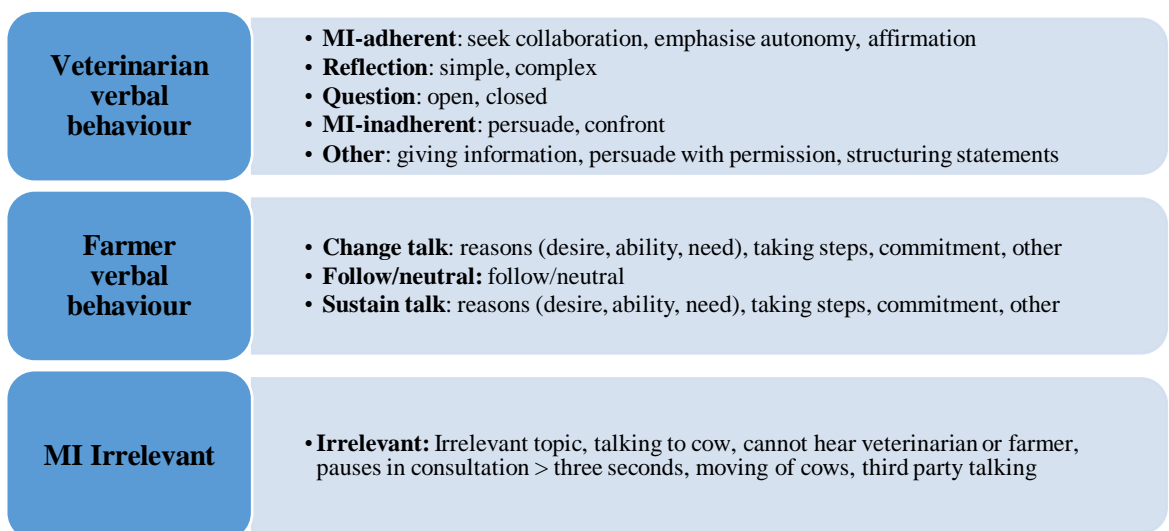


Figure 6-2. Ethogram codes collapsed into nine groups for statistical analysis: MI-adherent, reflection, question, MI-inadherent, other, change talk, sustain talk, follow/neutral, irrelevant

Table 6-4. Final 14 variables for inclusion in statistical analysis of communication behaviour

Derived from	Variable	Code	Descriptive category	SPSS Data	GSEQ Data
MITI coding	Question	QU	Neutral	Continuous	Text
	Other	OTH	Neutral	Continuous	Text
	MI-inadherent	MINA	Inconsistent	Continuous	Text
	MI-adherent	MIA	Consistent	Continuous	Text
	Reflection	RE	Consistent	Continuous	Text
	Reflection- Question ratio	REperQU	Consistent	Continuous	n/a
	% complex reflections	PerCCR	Consistent	Continuous	n/a
	Relational Global	RelGlobal	Consistent	Ordinal	n/a
	Technical global	TechGlobal	Consistent	Ordinal	n/a
CLAMI coding	Change talk	CT	Farmer language	Continuous	Text
	Follow/Neutral	FW		Continuous	Text
	Sustain talk	ST		Continuous	Text
Duration data	% veterinarian speech	PvetS	n/a	Continuous	n/a
Irrelevant coding category	Irrelevant	IR	n/a	n/a	Text

6.2.8 Analytical strategy

For the purposes of statistical analysis, significance was established as $\alpha = 0.05$.

6.2.8.1 Coding validity

For completeness and because all coding was completed by this author (Bard), coding validity was tested in advance of further statistical analysis statistically in two ways. First, as a measure of point-by-point reliability for sequentially-coded data, an event-based Kappa coefficient was calculated using GSEQ 5.1 (Bakeman and Quera, 2011) based on a sub-sample of double-coded consultation files ($n=4$, >10% total observation time, 52 minutes of 490 minutes total). Codes were matched utterance by utterance using an alignment algorithm implemented in GSEQ. Second, data on veterinarian global scores were analysed to determine if theoretically meaningful associations existed in coding attributions between veterinarian verbal behaviours (MI-adherent, MI-inadherent, other, reflection, question) and global measures (relational global, technical global; using SPSS Statistics 23, IBM Corp., Armonk, NY). As global data are non-parametric, a Spearman's rank correlation was performed.

6.2.8.2 *Training effect*

Data analysis sought to answer three questions:

1. Did brief training in MI significantly increase behaviour that is consistent with MI?
2. Did brief training in MI significantly decrease verbal behaviour that is inconsistent with MI?
3. What effect did brief training in MI have on farmer language?
4. Was brief training in MI sufficient for veterinarians to acquire MITI 4 (Moyers, Manuel and Ernst, 2014) basic competence?

For Questions 1-3, MITI, CLAMI and duration data were analysed using SPSS Statistics 23 (IBM Corp., Armonk, NY). For all continuous data (MIA, MINA, RE, QU, OTH, CT, FW, ST, ReperQU, PerCCR: Table 6-4) the assumptions of parametric testing were confirmed and variables were analysed using paired-samples t-tests to compare means before and after MI training. Ordinal data (RelGlobal, TechGlobal: Table 6-4) were analysed using a Sign Test, a non-parametric equivalent, given that the differences between paired observations were not normal nor symmetrical.

For Question 4, summary data concerning the level of veterinarian competency was assessed in line with the standards established within MITI 4 (Moyers, Manuel and Ernst, 2014); to meet a ‘fair’ level of competence in MI, veterinarians must achieve a mean score of 3.5 in relational globals (partnership and empathy) and 3 in technical globals (cultivating change talk and softening sustain talk), a reflection to question ratio of 1:1 and a 40% complex reflection percentage (of total reflections).

6.2.8.3 *Association*

Data analysis sought to determine:

1. Was there a significant association between MI-consistent verbal behaviour and farmer response?
2. Was there a significant association between MI-inconsistent verbal behaviour and farmer response?
3. Was there a significant association between MI-neutral behaviour and farmer response?

To determine the strength and direction of association between veterinarian verbal behaviour – MI-consistent (MIA, RE), MI-inconsistent (MINA), MI-neutral (OTH, QU) - and farmer response (CT, FW, ST), data were explored for linearity, outliers and normality, resulting in a Pearson's correlation between the variables of veterinarian other (OTH) and farmer follow (FW) verbal behaviour and a Spearman's correlation between all other possible veterinarian-farmer verbal behaviour pairings (SPSS Statistics 23: IBM Corp., Armonk, NY).

6.2.8.4 *Temporal relationships*

Data analysis sought to determine:

1. Veterinarian to farmer transitions - did MI-consistent behaviours lead to change talk and did MI-inconsistent behaviours lead to sustain talk?
2. Veterinarian to farmer transitions - were specific veterinarian verbal behaviours more likely to lead to commitment change talk?
3. Farmer to veterinarian transitions - how did veterinarians respond to farmer change talk, neutral language and sustain talk?

Sequential data analysis (GSEQ 5.1; Bakeman and Quera, 2011) was performed using event sequential data (streams of text code representing veterinarian and farmer utterances as they unfolded linearly within the consultation interaction). As in comparable studies (Moyers and Martin, 2006) the primary measures of interest were the transition probabilities between behavioural categories. A transition probability is a conditional probability measure relating an event within a consultation interaction at one time (t_1) to another time (t_2), with the difference between t_1 and t_2 termed a *lag*. Veterinarian and farmer verbal behaviours were analysed at lag one (immediate transitions) to allow evaluation of the temporal relationship between veterinarian and farmer verbal behaviours within herd health consultations.

To have a sufficient size sample size of behavioural transitions for analysis, data were pooled across all consultations (n=31) as in similar studies (Moyers and Martin, 2006; Klonek *et al.*, 2016). The data set yielded 3885 transition events between veterinarian (MITI) and farmer (CLAMI) verbal behaviour, which were unevenly distributed across 21 categories (Tables 5-1, 6-2). Given the large number of transitions, data were initially explored to determine if uncombined individual codes could be sequentially analysed to allow more nuanced exploration. However, to obtain reliable estimates of transition

probability significance, Chi-square tests on contingency tables larger than 2x2 require no more than 20% of expected counts to be less than five, and all individual expected counts to be one or greater (Yates, Moore and McCabe, 1999). A contingency table of all 21 MITI and CLAMI behaviours violated these assumptions. Codes were therefore combined for each research question to facilitate analysis.

Questions 1 and 3: Verbal behaviour codes were combined (as per coding recommendations; Martin *et al.*, 2005, Miller *et al.*, 2008) to increase cell matrix totals. For veterinarians, MIA, MINA, GI, RE and QU were constructed from combined subcodes, and for farmers, CT, FW and ST were constructed from combined subcodes (Figure 6-2). This analytical strategy ensured test assumptions were met (Yates, Moore and McCabe, 1999). Event sequential analysis was performed with these eight combined codes over lag one for veterinarian-farmer transitions and farmer-veterinarian transitions.

Question 2: Verbal behaviour codes were combined from subcodes (Martin *et al.*, 2005; creating veterinarian MIA, MINA, GI, RE, QU, Figure 6-2) and compared only to farmer change talk sub-codes (reason, taking steps, other, commitment). This analytical strategy met test assumptions (Yates, Moore and McCabe, 1999). Event sequential analysis was performed with these nine combined codes over lag one for veterinarian-farmer transitions.

6.2.8.5 2.8.5 *Veterinarian perceptions of brief training*

Data analysis sought to determine:

1. What learning outcomes would veterinarians report from brief training in MI?
2. What skills would veterinarians report as effective and ineffective with their clients?
3. What would veterinarians like and dislike about the training experience?
4. How much financial value would veterinarians attribute to the training experience, in terms of the amount of their CPD budget they would be willing to allocate?
5. Would veterinarians judge the training experience as worthwhile for other veterinarians to complete and why?

To explore these questions, a questionnaire consisting of one multi-choice question on the financial value of brief training and six open-ended questions on skills learnt, the use of these skills on farms, perceptions of the training experience and

recommendations for other veterinarians was given to participants (approximately two weeks post-training (Appendix 9). For the multi-choice finance question, the arithmetic mean of the financial values for brief training was calculated from all answers to this question (mean=sum cost attributed by all participants/number of contributing participants). For the six remaining free-form, open-ended questions, data were analysed thematically (Braun and Clarke 2006). For each question, data were explored using paper-based coding methods, where full written answers from participants were electronically scanned, printed, physically split into segments of distinct narrative statements (i.e. those that conveyed a singular concept, idea, phrase or comment) and were organised thematically by hand using inductive themes (i.e. themes determined by the dataset and not *a-priori*).

6.3 Results

6.3.1 Participant involvement

Of the those that attended training (n=60), 36 veterinarians completed the post-training questionnaire; these were anonymous meaning further demographic detail is not possible. With regards to communication data, 14 veterinarians achieved completion of the full study protocol (attendance at both clinical clubs or full day session as well as completion of pre- and post-training recordings with appropriate consent forms completed). These veterinarians provided further demographic data (Table 6-5).

Table 6-5. Demographics of study participants (n=14) with completion of full study protocol

Demographic	Veterinarians
Gender	Male (4), Female (10)
Age	21-30 (5), 31-40 (6), 41-50 (2), 60+ (1)
Years in practice as a veterinarian	1-5 (4), 6-10 (4), 11-15 (3), 16-20 (1), 21+ (2)

6.3.2 Coding validity

Sequential coding validity: Point by point reliability for overall categories was ‘almost perfect’ (Landis and Koch, 1977) at (K(E)=0.81) indicating strong agreement across repeated coding observations in the consultation sub-sample.

Relational global score and veterinarian verbal behaviour: analysis indicated statistically significant positive association between a veterinarian's relational global and the use of reflection ($p < 0.0005$), reflection to question ratio ($p = 0.01$) and percent complex reflections ($p = 0.001$), as well as statistically significant negative association between a veterinarian's relational global and MI-inconsistent ($p = 0.04$) and other ($p = 0.02$) verbal behaviour. A negative trend was seen in the association between a veterinarian's relational global and the proportion of consultation time attributed to veterinarian speech ($p = 0.09$).

Relational global score and farmer verbal behaviour: analysis indicated a statistically significant positive association between a veterinarian's relational global and farmer use of change talk ($p = 0.001$).

Technical global score and veterinarian verbal behaviour: analysis indicated statistically significant positive associations to the use of reflection ($p < 0.0005$), reflection to question ratio ($p = 0.02$) and per cent complex reflections ($p < 0.0005$), and statistically significant negative association to 'other' verbal behaviour ($p = 0.003$) and the proportion of consultation time attributed to veterinarian speech ($p = 0.05$). A negative trend was seen in the association between a veterinarian's technical global and MI-inconsistent behaviour ($p = 0.08$).

Technical global score and farmer verbal behaviour: analysis indicated a statistically significant positive association between a veterinarian's technical global and farmer use of change talk ($p = 0.001$) and a statistically significant negative association between a veterinarian's technical global and farmer use of sustain talk ($p = 0.04$).

6.3.3 Training effect

Full participant data are summarised in Appendix 10, with individual and mean differences in behaviours counts after training presented in Table 6-6 (significant variables identified).

Brief training and MI-consistent behaviour: Paired sample t-tests indicated a statistically significant increase in reflections ($p = 0.001$) and reflections per question ($p = 0.04$) post-training, in addition to a trend towards increased use of complex reflections ($p = 0.08$). A Sign Test indicated a statistically significant median increase in relational global scores ($p = 0.001$) and technical global scores ($p = 0.01$).

Table 6-6. Change in veterinarian verbal behaviour, farmer verbal behaviour and relative proportion of veterinarian consultation speech after brief MI training

Post-training 'ideal' change indicated in legend as (+) increase, (-) decrease, (∅) neutral

Post-training actual change indicated per score as (green) increase, (red) decrease, (blank) no change

Veterinarian	Veterinarian										Farmer		
	MI Adherent (+)	MI Nonadherent (-)	Other (∅)	Question (∅)	Reflection (+)	Reflections per Question (+)	% Complex reflections (+)	Relational Global (+)	Technical Global (+)	Proportion vet speech (-)	Change talk (+)	Follow (-)	Sustain talk (-)
1	4	4	17	9	3	0.16	33.33	0	0	-10.28	0	29	0
2	11	-15	-17	-9	5	0.58	54.55	2.5	1.5	3.56	-3	-23	-9
3	-1	-2	34	-10	10	0.36	-20.83	1.25	0.75	-14.43	26	30	-6
4	0	1	-49	2	4	0.4	42.86	1	2.5	-29.1	5	-39	1
5	3	-1	-3	14	14	0.19	9.09	1.5	0	-20.86	8	15	5
6	-11	-8	-14	18	11	0.15	53.92	1.5	1.5	-37.09	27	13	2
7	1	-1	10	18	-1	-0.67	-50	0	-0.5	10.22	-1	8	-1
8	4	-1	7	13	1	-0.48	-25	1.5	1	9.85	16	1	-5
9	4	-3	0	2	17	1.04	16.67	3.5	2	-25.69	32	6	2
10	2	-3	-9	-14	5	0.89	10	2	2	-10.12	15	-24	3
11	0	-13	-25	15	11	0.04	13.33	2.5	1.5	-36.28	21	-13	5
12	-2	-8	5	-23	-1	0.84	0	0	0	-12.18	2	-11	0
13	-1	-3	-16	10	3	-0.04	66.67	2.5	1	-0.8	-4	-15	3
14	-2	-11	-24	-10	14	1.07	29.55	3	2	-31.81	5	-10	9
Mean	0.86	-4.58	-6	2.5	6.44	0.32	16.73	1.63	1.09	-14.02	10.64	-2.36	0.64
Significance	<i>p=0.519</i>	<i>p=0.009**</i>	<i>p=0.297</i>	<i>p=0.498</i>	<i>p=0.001**</i>	<i>p=0.039*</i>	<i>p=0.083</i>	<i>p=0.0001**</i>	<i>p=0.012*</i>	<i>p=0.005**</i>	<i>p=0.006**</i>	<i>p=0.672</i>	<i>p=0.622</i>

*Significant at the $p < 0.05$ level

**Significant at the $p < 0.01$ level

Brief training and MI inconsistent behaviour: A paired sample t-test indicated veterinarians significantly reduced the use of MI-inconsistent behaviours post-training ($p=0.009$).

Brief training and farmer language: A paired sample t-test indicated farmers significantly increased change talk ($p=0.006$) post-training.

Brief training and 'fair' MI competency: Of the 14 veterinarians assessed for overall MI competency, none achieved a 'fair' level of MI competence pre-training, whilst three achieved 'fair' competence (Moyer et al. 2014) post-training. When assessed purely through global scores, one veterinarian achieved a 'fair' level of MI competence pre-training, whilst eight achieved 'fair' competence (Moyers et al. 2014) post-training.

Proportion of veterinarian speech per consultation: A paired sample t-test indicated veterinarians significantly reduced the proportion of the consultation time they spent in speech post-training ($p=0.005$).

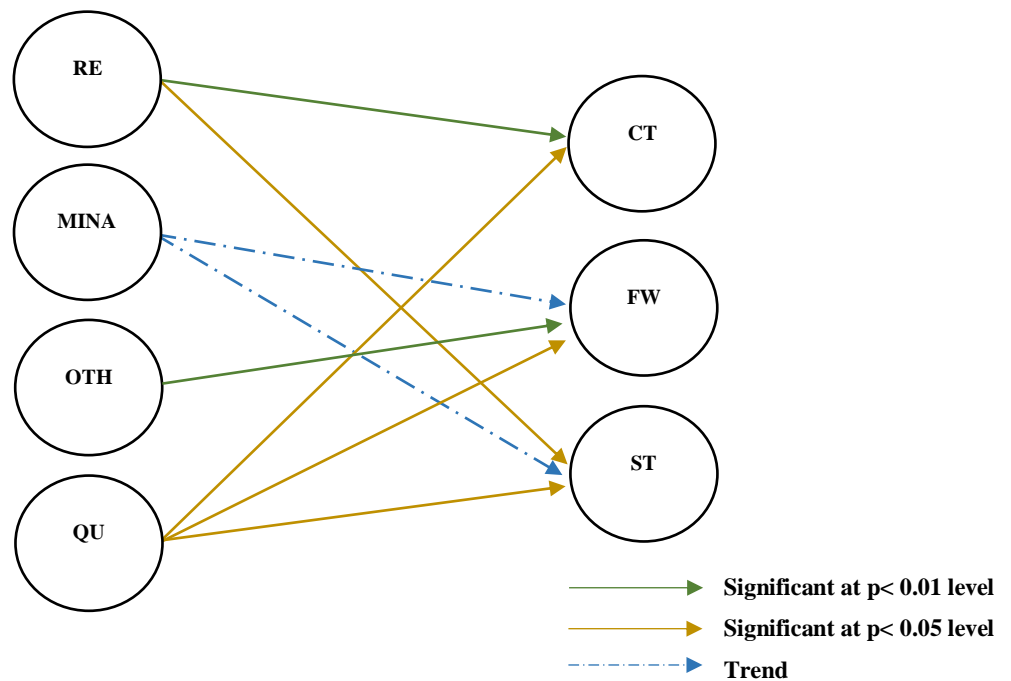
6.3.4 Association

MI-consistent behaviour and farmer response: analysis indicated a statistically significant positive association between veterinarians' use of reflections and both farmer change talk ($p<0.001$) and sustain talk ($p=0.002$) (Figure 6-3).

MI-inconsistent behaviour and farmer response: analysis indicated a trend towards positive association between MI-inconsistent behaviour in both sustain talk ($p=0.05$) and follow/neutral ($p=0.04$) (Figure 6-3).

MI-neutral behaviour and farmer response: analysis indicated a statistically significant positive association between veterinarian other behaviour and farmer follow/neutral response ($p<0.001$). Veterinarian questions indicated a significant positive association with all variants of farmer language, including change talk ($p=0.007$), follow/neutral ($p=0.01$) and sustain talk ($p=0.02$) (Figure 6-3).

Figure 6-3. Positive associations between veterinarian verbal behaviour and farmer response



Notes: *MINA: MI-inadherent, OTH: other, QU: questions, RE: reflections*
CT: change talk, FW: follow/neutral, ST: sustain talk

6.3.5 Temporal relationships

6.3.5.1 Veterinarian-farmer transitions

Question 1: Did MI-consistent verbal behaviours lead to change talk and did MI-inconsistent verbal behaviours lead to sustain talk?

Transition frequencies are presented in Table 6-7, with initial behaviours in rows (veterinarian) and subsequent behaviours in columns (farmer). For example, based on the table intersections, the frequency of change talk following a veterinarian question corresponds to a value of 78, whilst the frequency of sustain talk following a question corresponds to a value of 20.

Table 6-7. Transition frequencies from veterinarian to farmer at lag one in pooled MI feasibility trial communication data

Initial event	Subsequent event			Totals
	CT	FW	ST	
MIA	21	14	1	36
MINA	42	50	15	107
OTH	83	316	22	421
QU	78	371	20	469
RE	67	80	17	164
Totals	291	831	75	1,197

Notes: *MIA: MI-adherent, MINA: MI-inadherent, OTH: other, QU: question, RE: reflection, CT: change talk, FW: follow/neutral, ST: sustain talk*

Transition probabilities are presented in Table 6-8. Initial behaviours are presented in rows (veterinarian) and subsequent behaviours in columns (farmer). For example, the probability of change talk following a veterinarian question is 0.17, meaning change talk followed a question 17% of the time, whilst the probability of sustain talk following a veterinarian question is 0.04, meaning sustain talk follows a question 4% of the time.

The transition matrix deviated significantly from random transitions ($p < 0.01$) (i.e. an even distribution of transitions). Significant transition probabilities between MI-consistent (MIA, RE) and MI-inconsistent behaviours (MINA) and farmer change language are presented in Figure 6-4. Significant transition probabilities between MI-neutral behaviours (OTH, QU) and farmer change language are presented in Figure 6-5.

MI-adherent behaviours were followed by change talk more frequently than expected by chance ($p < 0.01$), whilst MI-inadherent behaviours and reflections were followed by both change talk and sustain talk more frequently than expected by chance ($p < 0.01$). Other and question behaviours were followed by follow/neutral behaviours more frequently than expected by chance ($p < 0.01$).

Table 6-8. Transition probabilities from veterinarian to farmer at lag one in pooled MI feasibility trial communication data

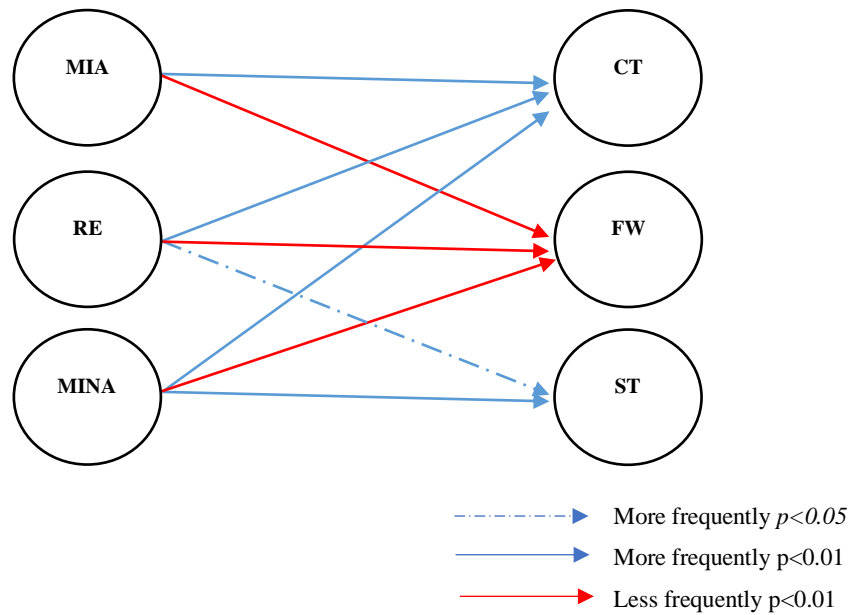
Initial event	Subsequent event		
	CT	FW	ST
MIA	0.58**	0.39 ⁱⁱ	0.03
MINA	0.39**	0.47 ⁱⁱ	0.14**
OTH	0.20 ⁱ	0.75**	0.05
QU	0.17 ⁱⁱ	0.79**	0.04 ⁱ
RE	0.41**	0.49 ⁱⁱ	0.10*

Notes: *MIA*: MI-adherent, *MINA*: MI-inadherent, *OTH*: other, *QU*: question, *RE*: reflection, *CT*: change talk, *FW*: follow/neutral, *ST*: sustain talk

More probable than chance: * $p < 0.05$, ** $p < 0.01$

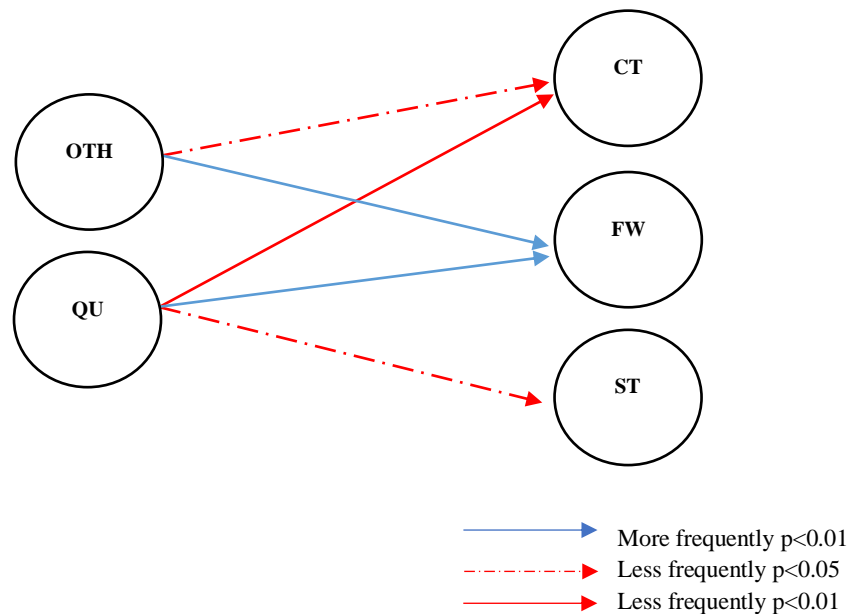
Less probable than chance: ⁱ $p < 0.05$, ⁱⁱ $p < 0.01$

Figure 6-4. Significant transitions between MI-consistent and MI-inconsistent veterinarian verbal behaviours and farmer change language in pooled MI feasibility trial communication data



Notes: *MIA*: MI-adherent, *MINA*: MI-inadherent, *RE*: reflection, *CT*: change talk, *FW*: follow/neutral, *ST*: sustain talk

Figure 6-5. Significant transitions between MI-neutral veterinarian verbal behaviours and farmer change language in pooled MI feasibility trial communication data



Notes: *OTH*: other, *QU*: question, *CT*: change talk, *FW*: follow/neutral, *ST*: sustain talk

6.3.5.2 *Veterinarian-farmer transitions*

Question 2: Were specific veterinarian verbal behaviours more likely to lead to commitment change talk?

Transition frequencies are presented in Table 6-9, with initial behaviours (veterinarian) in rows and subsequent behaviours (farmer) in columns.). For example, based on the table intersections, the frequency of change talk reasons following a veterinarian question corresponds to a value of 30, whilst the frequency of change talk commitment following a question corresponds to a value of 8.

Table 6-9. Transition frequencies from veterinarian to farmer change talk subcodes at lag one in pooled MI feasibility trial communication data

Initial event	Subsequent event				Totals
	CTC	CTO	CTR	CTTS	
MIA	6	8	3	4	21
MINA	4	21	12	5	42
OTH	4	40	28	11	83
QU	8	27	30	13	78
RE	2	22	33	10	67
Totals	24	118	106	43	291

Notes: *MIA: MI-adherent, MINA: MI-inadherent, OTH: other, QU: questions, RE: reflections CTC: change talk commitment, CTO: change talk other, CTR: change talk reason, CTTS: change talk taking steps*

Transition probabilities are presented in Table 6-10 with initial behaviours (veterinarian) presented in rows and subsequent change talk behaviours (farmer) in columns. For example, the probability of reasons for change following a veterinarian question is 0.38, meaning that on the transitions when change talk followed a veterinarian question, this change talk would be a reason for change 38% of the time.

The transition matrix deviated significantly from what would be expected due to chance ($p=0.01$) (i.e. an even distribution of transitions). MI-adherent behaviour was followed by commitment change language from the farmer more frequently than expected by chance ($p<0.01$) and was followed by reasons for change less commonly than expected by chance ($p<0.05$). Reflections were followed by reasons for change more frequently than expected by chance ($p<0.05$).

Table 6-10. Transition probabilities from veterinarian to farmer change talk subcodes at lag one in pooled MI feasibility trial communication data

Initial event	Subsequent event			
	CTC	CTO	CTR	CTTS
MIA	0.29**	0.38	0.14 †	0.19
MINA	0.10	0.50	0.29	0.12
OTH	0.05	0.48	0.34	0.13
QU	0.10	0.35	0.38	0.17
RE	0.03	0.33	0.49*	0.15

Notes: *MIA*: MI-adherent, *MINA*: MI-inadherent, *OTH*: other, *QU*: questions, *RE*: reflections *CTC*: change talk commitment, *CTO*: change talk other, *CTR*: change talk reason, *CTTS*: change talk taking steps

More probably than chance: * $p<0.05$, ** $p<0.01$

Less probable than chance: † $p<0.05$

6.3.5.3 *Farmer-veterinarian transitions*

Question 3: How did veterinarians respond to farmer change talk, neutral language and sustain talk?

Transition frequencies are presented in Table 6-11, with initial behaviours in rows (farmer) and subsequent behaviours in columns (veterinarian). For example, based on the table intersections, the frequency of a reflection following a farmer change talk corresponds to a value of 71, whilst the frequency of a question following farmer change talk corresponds to a value of 55.

Table 6-11. Transition frequencies from farmer-veterinarian at lag one in pooled MI feasibility trial communication data

Initial event	Subsequent event					Totals
	MIA	MINA	OTH	QU	RE	
CT	9	26	115	55	71	276
FW	10	56	416	192	130	804
ST	0	12	31	19	25	87
Totals	19	94	562	266	226	1,167

Notes: MIA: MI-adherent, MINA: MI-inadherent, OTH: other, QU: questions, RE: reflections, CT: change talk, FW: follow/neutral, ST: sustain talk

Transition probabilities are presented in Table 6-12. As above, initial behaviours are presented in rows (farmer) and subsequent behaviours in columns (veterinarian). For example, the probability of a reflection following sustain talk is 0.29, meaning reflections followed sustain talk 29% of the time.

The transition matrix deviated significantly from what would be expected due to chance ($p < 0.01$) (i.e. an even distribution of transitions). Significant transition probabilities between farmer change language and MI-consistent (MIA, RE)/MI-inconsistent behaviours (MINA) are presented in Figure 6-6, with significant transition probabilities between farmer change language and MI-neutral behaviours (OTH, QU) presented in Figure 6-7.

Change talk was followed by MI-adherent behaviours and reflections more frequently than would be expected due to chance (MIA $p < 0.05$, RE $p < 0.01$), whilst sustain talk was followed by MI-inadherent behaviours and reflections more frequently than would be expected due to chance (MINA $p < 0.05$, RE $p < 0.01$). Both change talk and sustain talk were less likely to be followed by other veterinarian verbal behaviour ($p < 0.05$) than would be expected due to chance.

Table 6-12. Transition probabilities from farmer to veterinarian at lag one in pooled MI feasibility trial communication data

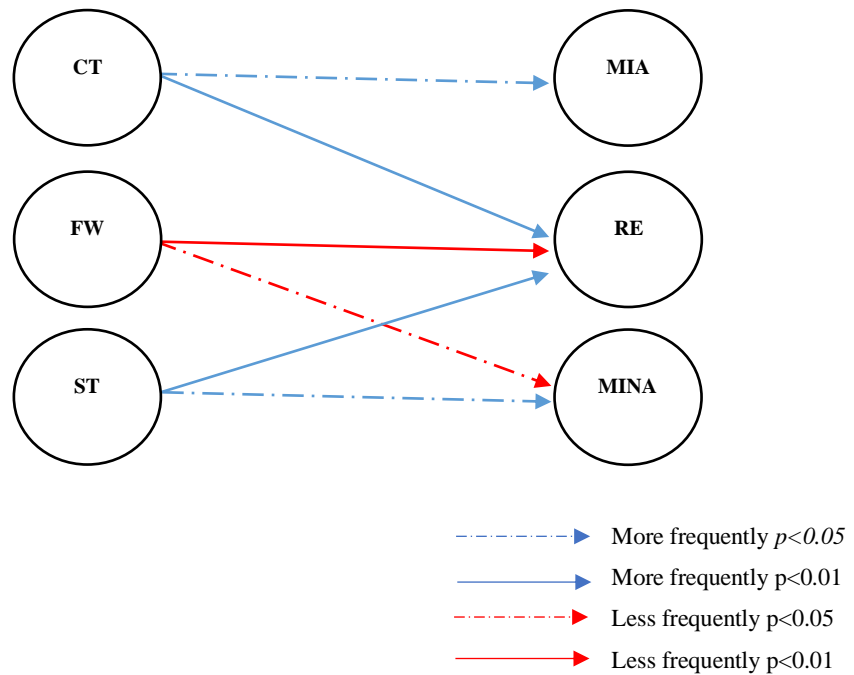
Initial event	Subsequent event				
	MIA	MINA	OTH	QU	RE
CT	0.03*	0.09	0.42 [†]	0.20	0.26**
FW	0.01	0.07 [†]	0.52**	0.24	0.16 [‡]
ST	0.00	0.14*	0.36 [†]	0.22	0.29*

Notes: Notes: MIA: MI-adherent, MINA: MI-inadherent, OTH: other, QU: questions, RE: reflections, CT: change talk, FW: follow/neutral, ST: sustain talk

More probably than chance: * $p < 0.05$, ** $p < 0.01$

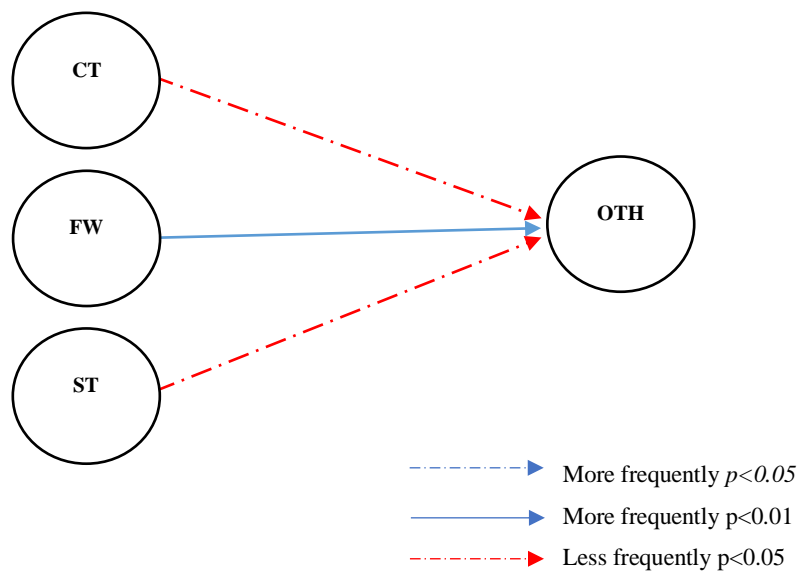
Less probable than chance: [†] $p < 0.05$, [‡] $p < 0.01$

Figure 6-6. Significant transitions between farmer change language and MI-consistent/MI-inconsistent veterinarian verbal behaviour in pooled MI feasibility trial communication data



Notes: MIA: MI-adherent, MINA: MI-inadherent, RE: reflections, CT: change talk, FW: follow/neutral, ST: sustain talk

Figure 6-7. Significant transitions between farmer change language and MI-neutral veterinarian verbal behaviour in pooled MI feasibility trial communication data



Notes: OTH: other, CT: change talk, FW: follow/neutral, ST: sustain talk

6.3.5.4 *Veterinarian perceptions of brief training*

[Please see Appendices 11 to 17 for full documentation of themes and participant quotes]

What learning outcomes did veterinarians report from brief training in MI?

Veterinarians reported learning a variety of MI-consistent ideas, including an awareness of the relational components of MI, technical awareness of change language, the importance of listening, the need to avoid the righting reflex (telling/offering solutions/fixing a problem for the farmer), the Four Processes of the methodology and how to evoke farmer confidence, ‘*how to be more positive with farmers and try and encourage their ideas*’. Their feedback indicated awareness of the core communication skill set of MI – open questions, reflections, affirmations and summaries (often referred to under the training acronym of OARS)- in addition to reporting a suite of broader learning benefits on how to effectively engage farmers, inspire change, improve client-veterinarian relationships, improve communication, structure conversations for change and appreciate the place of MI in veterinary practice:

“I learnt how to engage farmers more effectively and tackle a problem organically from the root of what the FARMER perceives as the problem.”

What communication skills did veterinarians report to be effective and ineffective with their clients?

A variety of MI-consistent approaches were only positively reported, including the importance of listening, avoiding the righting reflex, respecting farmer autonomy, evoking farmer confidence, talking less and a technical awareness of change language:

“Drawing out the farmers own reasons for change rather than going straight to my opinion.”

Veterinarians gave mixed reports on the core skills of open questions, affirmations, reflections and summaries; for example, reflections were useful for some veterinarians for stimulating farmer discussion and getting ‘*to the root of a problem*’, whilst for another this skill could feel ‘*stilted and potentially patronising*’. Similarly, open questions were

perceived as useful in some narratives, such as *‘asking how someone feels about the problem, asking what would make someone change,’* whilst for another the fact that *‘open questions don’t always lead to the answers needed’* caused them to be reported negatively. Mixed reports were also given on the Four Processes of MI, where difficulty separating the ‘engaging’ process in a herd health review was voiced given that *‘often clients are already well engaged with the issue if it has got to the point of having a herd health review about it.’*

Interestingly, when asked what communication skills did not work on farm, veterinarians reported wider considerations in addition to specific skills, such as issues in changing their *‘normal style’* with existing clients, the need for conscious adoption of skills rather than *‘just doing what you usually do’*, difficulty getting comfortable with using the skills initially, concern over appearing genuine when using them, confidence knowing whether to use the skills in non-change orientated conversations and difficulty finding space for MI, *‘I can’t always get them [the farmer] to stop talking.’*

What did veterinarians like and dislike about the training experience?

Questionnaire data indicated that the structure and simplicity of the training experience, the supporting materials (training notes, laminated cards) and the delivery through mixed media (talking, discussion, video, music, exercises) were positively received. The ‘human elements’ of the training were also enjoyable, including the group-orientated discussions, attitude and presence of the trainer (Bard) and atmosphere of the training: *‘I like the relaxed atmosphere – felt ‘safe!’*. With regards to content, veterinarians liked the evidence-based nature of the training, the fact that the methodology was a novel and fresh approach to advisory interactions and that it was thought-provoking whilst applicable and useful in their day to day work: *‘fantastic ideas on how to get clients to think differently about change.’*

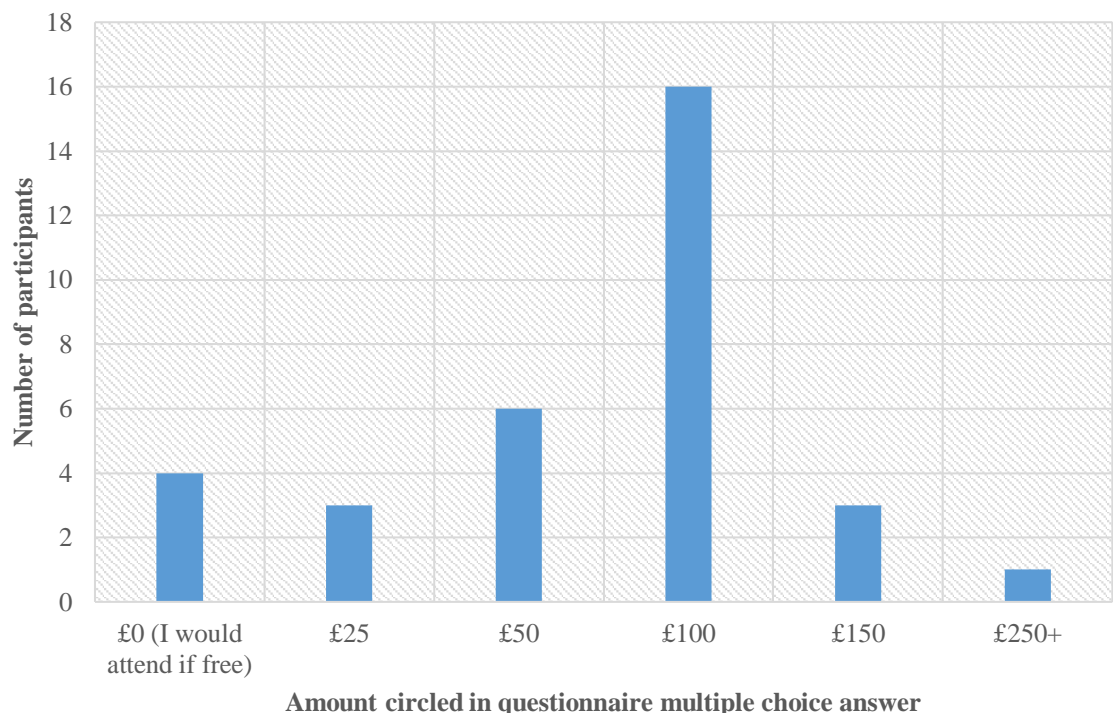
The experiential exercises received mixed responses, with some veterinarians positively reporting *‘the ability to practice the techniques and get some feedback and analysis on performance’*, whilst others felt there was too much active pair work involved. Elements of delivery that were not liked by veterinarians were the time-limited nature of the brief training (*‘in two evening sessions it felt a little rushed’*), too many mnemonics used as training aids (such as OARS for core skills), and the lack of closing the session with

sufficient re-cap or a practice consultation (due to time limitations). With regards to content, there was a need for more training topics such as what to do when MI is not working or when farmers are not talkative, with one individual also expressing attention difficulties where the skills taught felt similar to one another. Finally, one veterinarian reported the time of day to be troublesome, given that clinical club sessions are held at the end of a full working day: *‘hard to focus after a long day on farm- would be better as an afternoon session’*.

How much financial value did veterinarians attribute to the training experience, in terms of the amount of their CPD budget they would be willing to allocate?

The arithmetic mean price the questionnaire participants were willing to pay for training was £81.00 (median £100, interquartile range £50). Data from multiple choice are presented in Figure 6-8.

Figure 6-8. Responses to multiple choice question: ‘What amount (if any) of your CPD budget would you be willing to pay to take this training?’



Did veterinarians judge the training experience as worthwhile for other veterinarians to complete and why?

Of 36 participants completing the questionnaire, one felt they would probably not recommend the training as it *'might be available online'*, whilst one participant felt their decision to recommend would be based on whether their colleague was or was not good at communicating. The remaining 34 participants would recommend the training to a colleague, citing that it was interesting, important, useful, helpful, applicable, enhances communication, helps with motivating change and helps with more effective advice:

*"I think as vets we often give advice but fail to motivate change.
These skills should help, with better outcomes for us,
farmers and cows!"*

6.4 Discussion

6.4.1 Coding validity

Tests of coding validity indicated that the coder (Bard) showed excellent intracoder agreement, indicating consistency in code attribution throughout the data analysis process. Both the MITI (Moyers, Manuel and Ernst, 2014) and CLAMI (Miller *et al.*, 2008) codes evidenced theoretically meaningful associations. For example, relational global scores were positively correlated with reflection use ($p < 0.0005$); the empathy global of this relational element attempts to capture *'the extent to which the clinician understands or makes an attempt to grasp the client's perspective and experience... reflective listening is an important part of this characteristic'* (Moyers, Manuel and Ernst, 2014). Additionally, technical global scores were positively correlated with change talk ($p = 0.001$) and negatively correlated with sustain talk ($p = 0.04$). This technical global represents cultivating change talk, seeking to capture *'the extent to which the clinician actively encourages the client's language about change'*, and softening sustain talk, seeking to capture *'the extent the clinician avoids a focus on the reasons against changing'* (Moyers, Manuel and Ernst, 2014). Whilst the coding of consultations by one coder is not ideal, these tests suggest that the coding in this feasibility study was likely to be theoretically sound and reliable across multiple coding sessions.

6.4.2 Training effect

These data provide strong support for the potential for brief MI training to have a meaningful effect on veterinarian verbal behaviour; veterinarians significantly increased their use of MI-consistent skills and significantly decreased their use of MI-inconsistent skills post-training. As workshops intending to diffuse MI into ongoing practice typically involve a workshop over one to three days (Miller and Mount, 2001), this outcome is certainly positive given the brief nature of the training (four to five contact hours) in this context.

This significant improvement in a relatively short time frame may result from the synergy of two features within the veterinary communication context. First, the Spirit of MI (built upon collaboration, evoking farmer ideas and mutual understanding) echoes the cultural script of informality between veterinarians and farmers (Chapter Four) meaning training of this kind readily links with the relational identity cattle veterinarians desire in their client interactions. As such, those attending training are likely to engage positively with the concepts of the MI methodology. Secondly, baseline veterinary communication is directive in nature; veterinarians show a heavy reliance on closed questions, minimal solicitation of client opinion, minimal use of empathy and a predominance of information giving and persuasion (Chapter Three/Five, Shaw *et al.*, 2004; Jansen, 2010; McArthur and Fitzgerald, 2013). This directive style stands in stark contrast to the guiding and evocative style of MI, meaning if trainees adopt only the most basic ethos and behaviours from the training experience, this would be likely to manifest as measurable communication change.

Not all veterinarians were alike post-training, however, with more than half of trainees not only shifting significantly from baseline to see an effect, but in fact meeting the level of ‘fair’ competence defined in the MITI 4 (Moyers, Manuel and Ernst, 2014) for relational and global measures, with three able to comprehensively shift their communication style to one defined *overall* as ‘fair’ MI competence (Moyers, Manuel and Ernst, 2014). This adoption and integration of MI skill after brief training is a testament to the capacities of cattle veterinarians to readily integrate new skills and knowledge, in addition to a sign that relationship-centred communication is readily suited to this context. However, at present cattle veterinarians typically do not approach communication in this manner (Chapter Three) despite elements of relationship-centred

care being emphasised in the Calgary-Cambridge, a model that dominates veterinary communication teaching across the UK (Mossop *et al.*, 2015).

Chapter Three illustrates that integration of the step-wise process of the Calgary-Cambridge is not necessarily synonymous with the integration of the full suite of relationship-centred skills described within it; it appears that the skills most readily drawn from the Calgary-Cambridge in veterinary communication are those which relate to the flow of clinical tasks - identifying, defining and clarifying the problem, giving information and providing solutions - rather than the element of relationship building that should manifest as a continuous thread throughout the interview (Kurtz *et al.*, 2003). This is to the detriment of the veterinary advisory paradigm, for these relationship-building skills are reported by clients as desirable characteristics for veterinarian-client communication (Englar, Williams and Weingand, 2016) and their use results in increased veterinary client satisfaction (Coe, 2008). In consequence, given its grounding in the client-centred approach of Carl Rogers (Miller and Moyers, 2017), teaching MI as an adjunct to the Calgary-Cambridge may represent one route to amplifying the thread of relationship-centred communication within discussions on behaviour change in veterinary practice to enhance the experience for clients.

The training experience also had a significant effect on farmer language within these consultations, significantly increasing change talk coming from farmers in discussions of herd health. Research into the mechanisms of MI efficacy has identified two hypotheses that are likely to underpin this increase. The first - the relational hypothesis - is where a context of acceptance, empathy and collaboration within MI consultations acts as a facilitative condition for the spontaneous expression of change talk (Miller and Rose, 2009; Moyers, 2014). Post-training consultations evidenced a significant shift towards listening (increased reflection, decreased talking time), decrease in telling (reduction in persuasion) and a significant increase in empathy and collaboration (relational global scores), enhancing the relational context of the interaction. Second - the technical hypothesis - asserts that the proficient use of MI by advisors will affect client language by increasing in-session change talk and decreasing sustain talk (with this in turn predicting behaviour change; Miller and Rose, 2009). A significant shift in the technical capacity of the veterinarians in cultivating change talk and softening sustain talk (technical global) suggests that veterinarians were more aware of and able to shape change language coming from farmers. For example, in qualitative notes it was observed

that many veterinarians shifted to using more evocative, change-orientated questions following training in MI. Additionally, the technical hypothesis also establishes that verbal behaviours inconsistent with MI (persuasion, confrontation) are likely to increase sustain talk and decrease change talk (Magill *et al.*, 2014); veterinarians also significantly reduced the use of MI inadherent skills post-training, likely enhancing the potential for change talk in farmers to occur. Combined, significant advances in both relational and technical veterinarian competencies likely underpinned a significant increase in farmer change talk, suggesting the efficacy of the MI-consistent approach to enhance positive farmer engagement and resultant behavioural motivation in discussions of herd health.

It was noticeable in these consultations that the specific MI-adherent verbal behaviours of affirmation, seeking collaboration and emphasising autonomy were those that were more difficult for veterinarians to employ after a brief training experience. However, whilst the ability to articulate these elements in concise verbal behaviour was not significantly altered, the effect of the training exercises discussing them - reviewing the importance of recognising farmer strengths and abilities (affirmations), including their expertise within the consultation (collaboration) and recognising choice can be more powerful than persuasion (emphasising autonomy) - resonated in veterinarian's global consultation scores, as relational globals (partnership and empathy) were significantly increased. It therefore appears beneficial to maintain exposure to these topics in training, for whilst the in-depth exploration needed to enact the specific verbal behaviours may not be fully manifest in brief training, the didactic teaching and experiential exercises on these topics may still affect change in consultation ethos.

Overall, it appears that the 'concept' of an MI approach - that of a guiding and empathic style, recognising and shaping farmer change language - is powerful. With brief training, the ethos of MI may be readily enmeshed with current advisory practice stimulating a compelling alteration away from the directive style and towards one of connecting with farmers on change in a more meaningful way. Indeed, the increase in farmer change talk post-training supports this notion; it is this language that is predictive of more positive behaviour outcomes in a wide variety of intervention settings (Romano and Peters, 2016).

6.4.3 Association

Data suggest that the behaviours that dominate existing veterinary communication - information giving and persuasion (Chapter Three, Chapter Five, Shaw 2004, McArthur

and Fitzgerald 2013) - were not significantly associated with farmer expression of change talk and are more likely to be associated with neutral farmer language or language against change (Figure 6-3). Conversely, reflective empathic statements (arguably in the shortest supply in veterinary communication; Martin, 2006) were significantly associated with change and sustain language. These data support the relational hypothesis of MI: given a context of accurate and empathic listening, clients are more likely to spontaneously vocalise and explore change (Moyers, 2014). The significant shift in training towards an increase in these skills and a reduction in persuasion is therefore a positive one, which would be hypothesised to increase change talk. Indeed, change talk increased significantly post-training, supporting this assertion.

In addition to reflections creating a relational context conducive to change language, it is also possible that this association could have resulted from veterinarians deliberately choosing to reflect farmer change language (change/sustain talk) preferentially overall. It is well established that reflective statements reinforce and strengthen client statements, underpinning their role as evocative as well as empathic in nature (Miller and Moyers, 2017). Hence, reflecting change content strategically has the potential to enhance the likelihood of further change verbalisation, and can be used in an MI conversation to build momentum towards change (the technical hypotheses). Veterinarians may have also intuitively responded to farmer statements about change given their salience and meaning in relation to the consultation at hand, rather than with a strategic intention. Whether intuitive or deliberate, this preference for reflecting change language was evidenced in sequential analysis (Table 6-12), where following change or sustain talk there was a significant increase in the probability that a veterinarian would use a reflection.

The significant association between both sustain and change talk with reflection may suggest that reflections are a risky component in the consultation. However, the valence of a given reflection is liable to elicit very different responses (Apodaca *et al.*, 2016). For example, reflecting a farmer's reasons to stop mobility scoring is likely to engender a different response (sustain) than reflecting a farmer's reasons for wanting fewer lame cows (change). As such, veterinarians trained in awareness of the influence of change and sustain talk within the consultation will be able to use reflective verbal behaviour wisely, whether in the pursuit of strengthening change talk, as a non-confrontational and empathic response to sustain talk, or as a method of exploring and resolving ambivalence through shaping change language (Miller and Rollnick, 2012).

Whether the mechanism for increasing change talk stems from reflections as an empathic mechanism of connection (relational hypothesis) or evocative verbal behaviour (technical hypothesis), or indeed a combination or both, the positive association of these behaviours with farmer change talk suggests that their influence within herd health consultations is an important one. Relying predominantly on information giving and persuasion, associated only with neutral or sustain talk, may fail to engage or evoke a farmer's own positive reasons, steps or commitment to implement a change on farm, reasons which are critical for inspiring motivation to change (Amrhein *et al.*, 2003; Miller and Rose, 2009; Romano and Peters, 2016; Miller and Moyers, 2017).

6.4.4 Temporal relationships

Sequential analysis of veterinarian to farmer speech establishes a temporal link between the verbal behaviours veterinarians used and their farm clients' responses, illuminating the efficacy of recommendations made during their brief MI training. When veterinarians used recommended MI-adherent behaviours in behaviour change consultations (emphasising autonomy, seeking collaboration, affirming the farmer), there was a significant increase in the probability that the farmer would next discuss their reasons, ability, desire or needs in favour of making a change for herd health, steps that could be taken and their commitment or other thoughts for doing so. These MI-adherent behaviours were most likely to lead to farmer change talk and were the only behaviours to significantly increase the probability of commitment language from the farmer (a critical predictor of ultimate behaviour change; Amrhein *et al.*, 2003). Conversely, when using MI-inadherent behaviours, there was a significant increase in the probability that the farmer would next discuss their reasons against making a change for herd health, whether this be the reasons, steps to be taken, commitment or other thoughts for not doing so. MI-inadherent behaviours were also the most likely to lead to sustain talk. These findings reflect current literature on temporal relationships between advisor and client speech on the topic of behaviour change (Amrhein *et al.*, 2003; Moyers and Martin, 2006; Moyers *et al.*, 2009; Klonek *et al.*, 2016).

In agreement with the literature (Moyers and Martin, 2006), these data offer a clear prescription for veterinarians who wish to increase the positive engagement of farmers in discussions on change for herd health to: (1) emphasise the farmer's ultimate control on decisions relating to the management of their herd and over the change process itself; (2)

seek implicit or explicit permission when giving advice on herd health management; and (3) affirm farmer strengths, abilities and behaviour generously throughout. Similarly, veterinarians who wish to decrease farmer language arguing against proposed herd health measures should avoid (1) persuading farmers using tools such as compelling arguments, self-disclosure or facts; (2) giving tips, opinions or solutions to problems without an explicit statement or strong contextual cue that the farmer has a choice in the matter; and (3) arguing, disagreeing with, blaming or criticising the farmer. These principles are theoretically sound, reflecting agreement with values implicit in Self-Determination Theory that relate to inspiring internalised and personally integrated motivation (Ryan and Deci, 2000).

6.4.5 Veterinarian perceptions of brief training

Questionnaire feedback indicated that veterinarians experiencing brief training perceived that an MI-consistent approach worked with farm clients. Listening more, avoiding persuasion (the ‘righting reflex’), respecting farmer autonomy, evoking farmer ideas and confidence, responding to change language and generally talking less were all reported positively. Additionally, despite the brief nature of training, the experience was sufficient to stimulate a variety of learning outcomes, from technical and relational awareness (*‘I need to approach interactions with a more compassionate state of mind.’*) to more general MI-consistent approaches and specific MI skills (*‘reflections - always listen and reflect on what they have said’*). Given the significant increases in technical and global scores post-training, significant increases in reflections and reflection-to-question ratio and a significant reduction in persuasion (see 4.2), these self-reported behaviours do appear to align with the outcomes of quantitative communication analysis on the training participant sample (n=14).

What this quantitative analysis was unable to indicate was the meaning of these skills to the veterinarians, although veterinarians reported feeling better equipped to engage their farmers, improve client relationships, structure their conversations more effectively and inspire change after brief MI training (*‘It really opens one’s mind, that there are different aspects to communication and there is a lot one can do to become better at it by applying different approached and rules.’*). This feedback offers strong support that not only can MI skills be learnt, but they empower veterinarians in conversations about change for

herd health. As one veterinarian reported, the skills encourage ‘*soft responses from hard farmers*’, the very heart of the issue of behaviour change on farms.

It is important to note that this positive interpretation was not universal, with issues reported in applying elements of the Four Processes of the MI consultation and aspects of the core communication skill set, in addition to wider challenges of changing personal communication styles, needing more practice of the skills, wanting to appear genuine, achieving conscious adoption, finding ‘space’ for MI conversations and querying how to apply the communication skills outside of change conversations. What is heartening in this feedback is that these comments could be attended to with the provision of a longer training period (which was desired by participants) and further training enrichment (such as individual coaching or group skills feedback on recorded tapes). For example, issues raised with core skills such as the use of reflections - an inability to use them due to time pressure and the sense of being stilted or patronising - are issues that could be addressed through extended experiential exercises on reflection, group discussion of recorded herd health tapes encouraging critical assessment of core skill use/effect and individual coaching to enhance ease of use and confidence. Wider challenges to MI adoption could also be integrated as training discussion topics if more time was available within training, offering participants the opportunity to discuss and share their approaches to tackling these issues on farm and receive additional coaching from a trainer.

In terms of financial value, the training as provided (four to five hours) was perceived to be worth a mean monetary fee of £81.00, giving the training the potential to be commercially viable given that training sessions would ideally be a minimum of six participants per group (£486 per pair of sessions). The high number of veterinarians that would recommend the brief training experience (34 of 36 participants) suggests that this communication methodology offers something of value to the practicing cattle veterinarian, as summarised by one individual; ‘*Motivating change is critical to farm practice and improving animal health and welfare. This seems to be the most proven way of achieving this at the moment.*’

6.5 Conclusions

Data in this study exploring the feasibility for MI to be harnessed by cattle veterinarians suggest brief training can have a meaningful impact on advisory style. Veterinarians in the post-training sample showed a compelling alteration of the directive approach of herd health discussions towards one of connecting with farmers on change in a more meaningful way, evidenced by significant enhancement of relational and technical MI communication skills and increased farmer change language (which is predictive of positive behaviours outcomes; Romano and Peters, 2016). Additionally, sequential analysis of communication data suggest this move away from a directive approach is significant; behaviours that dominate in a directive approach (information giving and persuasion) were significantly associated only with neutral or sustain farmer language, failing to engage or evoke a farmer's own positive reasons, steps or commitment to implement a change on farm, which are critical for inspiring motivation to change (Amrhein *et al.*, 2003; Miller and Rose, 2009; Romano and Peters, 2016; Miller and Moyers, 2017). Additionally, these adopted skills echo the desirable characteristics of mutualistic communication reported as desirable by both parties in the herd health paradigm, whilst embedding a collaborative and evocative advisory ethos that reflects the cultural script of informality and shared understanding expected on farm (Chapter Four).

Is it critical to note that longevity of these changes in veterinarian communication behaviours are unknown. For individual veterinarians that developed a more MI-adherent style, communication behaviours could drift over time back toward baseline, eradicating the benefits of training, or continued use and practice of the skill set could maintain or strengthen the behaviours seen (Miller and Mount, 2001). Wider research on the training and maintenance of MI communication skills suggests the enhancement of skills from a one-time workshop are modest at best and tend to decay to baseline within a year, unless additional training enrichment is used (individual coaching, skills feedback and interim training refreshment; Miller and Moyers, 2017). Future studies of MI training would benefit from the capacity to offer these services; indeed, if exploring the effects of training over time (such as measuring on-farm outcomes), this provision would be essential to ensure that MI was being delivered effectively within the intervention study.

Nevertheless, despite these concerns, the immediate experience for farmers receiving a more MI-adherent advisory style in this feasibility study appeared positive. The

significant increase in farmer change talk in discussion of herd health management was indicative of better engagement, with MI research linking this increase to the potential for better on-farm outcomes (Romano and Peters, 2016). Additionally, questionnaire data suggest that the training experience offered veterinarians novel skills that positively enhanced their interactions with farmers and added confidence and efficacy to their advisory approach, even with brief contact time. Overall, this feasibility study suggested that the integration of MI skills within the herd health consultation has the potential to be feasible, practical and beneficial, if due care and attention is paid to ensuring skills are adequately integrated into practice and training enrichment is available to maintain and validate skills maintenance over time. Further research exploration attending to these considerations is therefore likely to be of benefit to the cattle veterinary community.

6.6 Further study

Future studies in this research context would benefit from (i) a larger sample size; (ii) the capacity to follow up on behaviour change consultations with on-farm outcomes; (iii) the use of more contact time and enrichment (coaching, feedback, top up training); and (iv) more than one coder for consultation analysis.

(i) In this feasibility study, the training process aimed to achieve a larger sample size, with a total of 60 veterinarians experiencing brief training. However, the complexities of data collection (see 6.2.1) meant that only a selection of veterinarians attending training met the study criteria for consultation analysis with the subsample of analysed data being therefore substantially reduced (n=14). Future studies would benefit from including a greater sample of veterinarians and farmers to (i) establish the validity of the findings in this study; (ii) to be able to investigate whether and how veterinarian and farmer characteristics (such as age, gender, experience) influence communication behaviours; and (iii) explore more intricate questions on veterinarian performance (for example, with a greater sample of consultations from each veterinarian, variability in MI use across clients and herd health change goals could be examined).

(ii) The link between change language within consultation and meaningful, on-farm outcomes (such as a change in bulk somatic cell count following a mastitis consultation) would be the ‘gold standard’ validation of a future training intervention (Miller and Rollnick, 2014). These outcomes could allow the link between farmer change language

and on-farm behaviour to be explored and validated, as in the medical and psychotherapy literature (Miller and Moyers, 2017).

(iii) To ensure this ‘gold standard’ validation of training was indeed measuring the impact of MI communication on herd health outcomes, enhanced training and enrichment (coaching, feedback, top-up training) to embed the full MI skill set would be critical. Additionally, validating the skill set of participants by setting a threshold for minimum participant competence in the methodology for trial inclusion (such as meeting the MITI 4 criteria; Moyers, Manuel and Ernst, 2014) would be essential to accurately validate the connection between MI use and measured on-farm change.

(iv) Herd health consultations are at present known to be MITI 4 (Moyers, Manuel and Ernst, 2014) coded by this author and MICLab Stockholm (MIC Lab, 2018). However, the combination of the MITI, CLAMI and herd health-specific codes within Noldus Observer (Noldus Information Technology, 2018) to capture verbal behaviour durations and temporal sequences (in addition to frequencies) is, to this author’s knowledge, unique. Whilst offering critical insight for this feasibility trial, this excluded the possibility of multiple coders as no additional researchers could be recruited to learn the novel coding package alongside this author. Further studies would benefit from enhancing reliability by recruiting and training multiple coders for the purposes of data analysis (Moyers *et al.*, 2016).

***NB:** Work is currently being undertaken in collaboration with the Swedish University of Agricultural Sciences that meets the demands highlighted in this ‘further study’ section, which is anticipated to add further insight and clarity on the place of MI in herd health advisory consultations on behaviour change [**Project:** ‘Motivational interviewing as a means to decrease antimicrobial drug use in animal production’ (Formas call: 2015)].*

Chapter Seven

Discussion and conclusions

*“We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time”*

T. S. Eliot

7.1 Introduction

At the outset of this thesis (Chapter One), there were a number of knowledge gaps identified relating to our understanding of the herd health advisory context; namely, a current lack of exploration of Self-Determination Theory in the field of farmer behaviour (despite a promising evidence base on its utility in designing interventions), a lack of ‘relevant’ applied interventions in the herd health context utilising change theory and a lack of qualitative exploration and understanding of the veterinary advisory paradigm on herd health and how cattle veterinarians approach communication and advice in the pursuit of behaviour change. To conclude Chapter One, addressing these knowledge gaps was argued to be of critical importance, given growing concern over endemic issues in the uptake on advisory recommendations on farms and the ‘battle ground’ of farmer behaviour change reported as a struggle for those working in a veterinary advisory role (Ruston *et al.*, 2016).

Given the promise of SDT-led interventions highlighted in Chapter One and the deficit in applied interventions indicated by Ritter and colleagues (2017), the integration of SDT within this research was subsequently explored (Chapter One) through the potential adoption by veterinary advisors of Motivational Interviewing, an evidence-based communication methodology whose alignment with SDT principles suggested a ‘fruitful marriage’ for applied change-orientated research (Vansteenkiste and Sheldon, 2006). Current deficits in veterinary communication and practical opportunities for implementation within the herd health advisory paradigm suggested the promise of MI in this context (Chapter One), with the application of the MI methodology to enhance veterinary advisory services (of any kind) a novel and as yet unexplored research topic. It was hypothesised in Chapter Two that MI training would lead to improved veterinarian communication on herd health recommendations, creating a positive shift in farmer response to advice and thus an increased chance of positive behaviour change.

To test these hypotheses, five objectives were identified (Chapter Two):

- (1) Establish how veterinarians currently advise on behaviour change
- (2) Establish veterinarian and farmer perceptions and attitudes towards advice, communication and behaviour change on farms
- (3) Establish current use of MI skills within veterinarian communication in the pursuit of behaviour change

- (4) Establish the feasibility of using existing consultation analysis tools for verification of MI skills in the context of herd health advisory consultations
- (5) Undertake a feasibility study to determine if veterinarians can learn core MI skills and apply these in herd health discussions in the pursuit of farmer behaviour change, with the goal of informing further interventions

In the following three sections, the research findings achieved from pursuing these objectives are drawn together to demonstrate the key contributions made by this research to the veterinary field. Subsequently, ethical and practical considerations implicit in the adoption of MI are summarised, so as not to offer a prescription for practice based solely on applicability and feasibility of the methodology but rather an integrated view of the cattle veterinarian and MI advisory contexts. Finally, directions for further study in future research endeavours aiming to enhance advisory services for animal health and welfare are summarised, before final conclusions are made.

7.2 Current herd health paradigm and MI

7.2.1 Current cattle veterinarian communication on behaviour change

In Chapters Three and Five, role-play communication between veterinarians (n=15) and an actress experienced in medical and veterinary education attempted to capture a ‘typical’ advisory interaction in the pursuit of behaviour change for herd health. Qualitative analysis suggested that veterinarian communication matched that witnessed in wider research literature; veterinarians tend to communicate in a directive style (minimal eliciting of client opinion, dominating the consultation agenda, prioritising instrumental support), reflecting a paternalistic role in the consultation interaction. Indeed, this paternalistic role appeared to be sufficiently embedded in the veterinarian identity to influence even pronoun use, with the incongruence between veterinarian and farmer pronoun adoption indicative of an advisor that is a conduit or coordinator (but not necessarily participant) in herd health.

Quantitative exploration of data utilising the Motivational Interviewing Treatment Integrity code (MITI 4; Moyers, Manuel and Ernst, 2014) indicated that veterinarians in this sample did not utilise MI at a level of fair competency, as would be expected from the nuance detailed in initial qualitative analysis. However, these data were still considered promising, as veterinarians communicated in a way that suggested relational

engagement had value, fostering empathy through the symbolic meaning of offering instrumental support, attention to cultivating trust through emphasising the virtue of their ability and explicitly referring to farmer concerns and context (such as milk price). Where the uptake and embodiment of MI communication is not easy without specific training experience (Miller and Rollnick, 2009), the inability to move from relational intent to communication behaviour is understandable. MI skills training was hypothesised to facilitate the translation of this intent into communication behaviour.

Role-play data were potentially limited in their representation of cattle veterinarian advisory discourse, given their artificial nature; veterinarians were time limited (<15 minutes), did not have an established relationship with the client and were ‘performing’ a role. However, communication behaviours were representative of wider research reflecting ‘naturally occurring’ consultations where ‘real’ relationships are established (Shaw *et al.*, 2004; Jansen, 2010; McArthur and Fitzgerald, 2013), with time limitations comparable to data in the small animal context (Shaw *et al.*, 2006; Everitt *et al.*, 2013; Robinson *et al.*, 2014) and advisory interactions on farm that are often restricted to fit around other practical tasks (for example, interspersing cattle fertility checks). Nevertheless, recommendations for future study were made to encourage the use of ‘real world’ data, to establish whether communication behaviours are maintained given varied animal health topics and the complexity of differing clients, environments and human-animal relationships.

7.2.2 Factors influencing the enactment of advice on UK dairy farms

In Chapter Four, interview data suggest that in discerning the factors that influence the enactment of veterinary advice, what is ‘science’ and ‘knowledge’ can never be fully disentangled from what is local and relational; enacting advice requires this positive entanglement of both these qualities. When considering whether farmers are likely to engage with advisory recommendations, veterinarians are consequently encouraged to consider whether they are trusted by their farm clients (based on perceived virtues of benevolence, ability, integrity and consistency), whether they emphasise and embody their (perceived) shared understanding with these clients and the influence of the farmer’s world view on whether advice will manifest meaning in the farmer’s eyes and thereby stimulate behaviour change. Communication itself was perceived to be integral in all these processes, acting as the foundation that builds trustworthiness and a shared

understanding, whilst having the potential to catalyse the world view given desirable (relationship-focused) attributes.

These nuances in the veterinary herd health paradigm suggest a compelling relational narrative for the adoption of MI within the cattle veterinary context. Through MI-adherent communication, veterinarians could consciously pursue the shared understanding that is so valued by their farm clients by promoting collaboration and evocative exploration of farmer views, embed the desirable features of mutualistic communication that encourage farmer engagement and implementation and actively promote personal virtues that are critical to the trusting relationship (such as benevolence, central to MI Spirit). For farmers, seeking social connection in addition to scientific content, this process would encourage meaning to be manifested in advisory recommendations through a better chance of real engagement with their local world view and personal motivations, attitudes and perceptions.

It is important to note that the methodological approach of this study (in-depth interviews and thematic analysis) was chosen to explore and uncover the complexity of interviewee experiences within the herd health advisory paradigm, rather than seeking to quantify opinions of veterinarians and farmers in this context or generate a representative sample of those opinions (Vaarst *et al.*, 2007). As such, this author intends for these outcomes to be a rigorous, valid and detailed insight into this advisory paradigm, rather than a representative description.

7.3 Researching MI applicability to the herd health context

7.3.1 Methodological development: coding, analysis and data collection

Data on current communication in the pursuit of behaviour change suggested a need for training in the methodology (Chapter Three), supported by the potential for MI to match the unique nuances of the on-farm advisory paradigm (Chapter Four). With the goal of establishing a training feasibility trial, Chapter Five explored the usefulness and applicability of an existing coding protocol (the Motivational Interviewing Treatment Integrity Code, MITI 4; Moyers, Manuel and Ernst, 2014) to role-play data to inform methodological development. MITI 4 (Moyers, Manuel and Ernst, 2014) coding exploration suggested the protocol was a useful coding tool to support the analysis MI in the herd health context, with positive outcomes in applicability and assessment of verbal

behaviour measures, good intracoder agreement between two coding bouts and sound data utility for assessing an intervention trial.

Various suggestions were made with the intention of enhancing the quality and accuracy of insight in the feasibility trial; the need to (i) record ‘real world’ data between cattle veterinarians and their farm clients; (ii) employ a coding methodology that would facilitate the recording of farmer change language, the temporal relationships between veterinarian and farmer verbal behaviour and durations of verbal behaviours; (iii) validate coder reliability; and (iv) ensure the MITI 4 (Moyers, Manuel and Ernst, 2014) global measurement of softening sustain talk received critical consideration and research in advance of the feasibility study coding process.

These methodological recommendations were realised in the feasibility trial (Chapter Six), where (i) veterinarians recorded ‘real life’ advisory interactions with dairy clients on-farm; (ii) advisory interactions were coded for verbal behaviour frequencies, durations and temporal sequences were captured utilising the behavioural interaction software Noldus Observer (Noldus Information Technology, 2018), with an adaption of the MITI 4 (Moyers, Manuel and Ernst, 2014) and CLAMI (Miller *et al.*, 2008) code to record both veterinarian and farmer language respectively; (iii) kappa analysis of double-coded data was performed on sampled data and established data validity; and (iv) consultation with an established coding lab and MITI 4 author helped to set decision rules for the difficult softening sustain talk global.

7.3.2 MI feasibility study: outcomes

Chapter Six explored the feasibility for MI to be harnessed by cattle veterinarians through the experience of brief training (four to five contact hours). Comparison of veterinarian verbal behaviour before and after training suggests that brief MI training can have a powerful effect on veterinarian advisory language, with post-training samples evidencing significant reductions in persuasion/confrontation and significant increases in relational, technical and reflective (empathic) veterinarian ability. A significant increase was also witnessed in farmer change talk in the post-training sample, indicative of farmers engaging in herd health discourse more positively.

Sequential analysis of temporal communication data also supported the causal chain hypothesised within MI; namely, that those verbal behaviours that are especially consistent with MI (such as seeking collaboration, emphasising autonomy and affirming)

are likely to increase the probability of client change talk, whilst those in that are inconsistent with MI (such as persuasion) are likely to increase the probability of sustain talk. These outcomes are particularly significant given the predictive value of this language, with clients that offer relatively more change talk than sustain talk during advisory interactions more likely to implement change than comparable clients who offer more sustain talk than change talk (Campbell, Adamson and Carter, 2010; Morgenstern *et al.*, 2012; Walker, 2012; Gaume *et al.*, 2013).

Questionnaire data from participating veterinarians suggested that this quantitative assessment of veterinarian skill aligned with qualitative self-reports on the experience of brief training - namely, that veterinarians were able to adopt a variety of MI-consistent approaches and core skills in their interactions with clients. Additionally, questionnaires highlighted the meaning of these skills to the veterinarians; that veterinarians reported feeling better equipped to engage their farmers, improve client relationships, structure their conversations more effectively and inspire change after brief MI training indicating that this novel approach offered '*something genuinely different that made a lot of sense*'.

Although outcome data were positive, the skills especially consistent with MI (emphasising autonomy, seeking collaboration and affirming) were most difficult for veterinarians to employ post-training, with no significant increase seen in frequency after the training experience. Veterinarians also reported concerns in questionnaire data over the application of core skills/engaging processes in herd health discussions and discovered wider challenges to adopting the MI methodology, such as issues with changing personal communication style and feeling genuine with the novel skill set. The significant changes witnessed in post-training verbal behaviour are also not guaranteed to be maintained over time, with enhancement of skills from a single workshop likely to decay without additional training enrichment such as coaching and feedback (Miller and Moyers, 2017). As such, whilst offering optimism on the veterinary capacity to learn and employ MI communication skills, full utilisation of the MI methodology and maintaining competence over time is likely to require a longer training time (as desired by questionnaire participants) and greater input of post-training coaching, feedback and support.

In addition to these training considerations, several recommendations for future study were made, including the need for (i) a larger sample size, to allow exploration of

veterinarian and farmer characteristics and variable change goals on MI proficiency; (ii) the capacity to record on-farm outcomes as a ‘gold standard’ measure of farmer engagement in a behaviour change consultation; (iii) the use of more contact time and enrichment (coaching, feedback, top up training) to ascertain skill acquisition and prevent communication skills drift to baseline; and (iv) more than one coder for consultation analysis, enhancing reliability of consultation coding.

7.3.3 MI as an SDT-inspired intervention within the herd health advisory paradigm

Chapter Six suggests that an MI-led intervention could offer an effective approach to integrating SDT factors (specifically autonomy (volition, choice), relatedness (belonging, connection, care) and self-efficacy (competence); Ryan and Deci, 2000) within the herd health paradigm, which would be critical to encourage farmer internalisation and integration of change. Firstly, veterinarians in the post-training sample enhanced their ability to respond to and shape change language, evidenced in a significant increase in their technical global score post-training. This suggests increased attention towards and capacity to cultivate change talk, language that is fundamental to promoting and supporting volition, self-regulation and choice in an advisory interaction (Miller and Rollnick, 2012). Indeed, through this technical skill set, MI ‘*assumes, respects and implicitly relies on volition to instigate self-regulation*’ (Miller and Stephen Rollnick, 2012), deeply connecting it to the SDT factors of autonomy and self-efficacy (Ryan and Deci, 2000).

Secondly, veterinarians in the post-training sample were able to enhance their relational approach to interactions with farm clients, using more reflections (considered the heart of empathic understanding; Rogers, 1986) in their verbal behaviour, enhancing their relational global scores (evidencing partnership and empathy) and significantly reducing persuasion and confrontation. These changes could facilitate the enactment of SDT factors in three ways: (i) enhancing the sense of relatedness that the farmer experiences, given the consistency between the relational aspects of MI and the relatedness component of SDT (Miller and Rollnick, 2012); (ii) fostering farmer self-efficacy more effectively, as enhanced partnership skills suggest more power-sharing in the advisory interaction, where farmers are given opportunities to use their own knowledge to solve the change goal under discussion (Moyers, Manuel and Ernst, 2014); and (iii) promoting farmer

autonomy, where significant reductions in persuasion are indicative of interactions post-training that were more respectful of farmer choice and self-direction, given a reduction in veterinarians providing advice without permission and/or reducing their overt attempts to change the farmer's mind using strategies such as compelling arguments or facts (Moyers, Manuel and Ernst, 2014).

However, it was noticeable in post-training consultations the MI verbal behaviours that powerfully encapsulate the factors established within SDT - those of providing affirmation, seeking collaboration and explicitly emphasising autonomy - were those that were most difficult for veterinarians to employ after just a brief training experience (Chapter Six). This suggests that to achieve a 'fruitful marriage' (Vansteenkiste and Sheldon, 2006) with SDT principles, an MI intervention in the cattle veterinary context would benefit from resolving the limitations on MI training that this author experienced (such as having the capacity to provide longer training periods with training enrichment; Chapter Six) in order to promote enhanced veterinarian uptake of these specific and SDT salient skills. Nonetheless, brief training exposure was still sufficient to stimulate meaningful change in a variety of veterinarian communication behaviours congruent with SDT, suggesting post-training participants had a greater capacity to motivate farmers to value, self-regulate and (without external pressure) carry out and maintain advisory recommendations in a self-directed manner.

7.4 Considerations in the application of MI within the herd health advisory paradigm

This research thesis suggests that the use of MI within the herd health paradigm may not only meet a communication deficit in the pursuit of behaviour change on farms, but also offer a contextually appropriate, feasible and beneficial approach to inspiring farmer engagement and subsequent behaviour change (providing appropriate adherence to training and training enrichment provision: Chapter Six). However, critical to discussion of the applicability of MI to this context are two further considerations: whether MI *ought* to be applied to herd health discussions (given ethical consideration) and whether it is *possible* to apply it (given practical consideration). These contextual considerations are explored below, before recommendations for further research and training are made to complete this discussion.

7.4.1 Ethical consideration on the adoption of MI

7.4.1.1 *The acceptability of influence to the veterinary profession*

The protection of animal health and welfare is central to the veterinarian identity, conveyed and embedded via their oath upon admission to the Royal College of Veterinary Surgeons: ‘*I promise... that, above all, my constant endeavour will be to ensure the health and welfare of animals committed to my care*’ (RCVS, 2018a). As demonstrated in this thesis, fulfilling this oath is complex and requires not only the scientific expertise on animal health gained via training in veterinary science, but the ability to effectively communicate this expertise to animal owners to encourage its implementation through behaviour change. Current challenges in the ability to be proactive advisors (da Silva *et al.*, 2006; Mee, 2007; Jansen *et al.*, 2010) and a recognised need for better skills in understanding and influencing farmer behaviour (Ruston *et al.*, 2016) infer a bigger ethical dilemma; that these road blocks to behaviour change fundamentally obstruct a veterinarian’s ability to fulfil this oath on farm.

Given our hypothesis (Chapter Two) that MI-consistent communication would lead to improved engagement with veterinary recommendations on farms (supported by the MI feasibility study, where post-training advisory consultations evidenced significantly increased farmer change talk; Chapter Six), the opportunity to adopt the MI methodology becomes ethically compelling. In offering important influencing skills to veterinarians to better engage clients with recommendations for animal health, MI may in fact encourage better adherence to the veterinary oath that is central to professional veterinary conduct. However, where the use of MI brings with it an explicit intent to influence client behaviour, further ethical consideration arises; concern (as well as efficacy) in MI is inherent in the potential that skilful use of the methodology can alter client volition, choice and behaviour (Miller and Rollnick, 2012), meaning the type and extent of influence employed within MI must be acceptable to the veterinary profession.

To explore this question, a brief supplementary study gathered opinions of veterinary professionals and member of the MI Network of Trainers on what would be considered ‘acceptable influence’ in daily practice (Appendix 18, 19). Data suggested that veterinary professionals were willing to tolerate more forms of influence over a client in daily practice than MI professionals, potentially stemming from MI professionals shaping their practice via the clear requirements of MI Spirit established by Miller and Rollnick (2012)

demanding committed use of compassion, acceptance, partnership and evoking. These requirements would naturally inhibit the use of some influence forms (peer pressure, forcing options, coercion), and make other forms of influence (emotional priming, value loading, societal influence) less acceptable than for an average veterinary professional whose practice is not constrained by this specific ethical philosophy.

As a result of this exploration, it was concluded that teaching veterinarians the necessary philosophy with which to practice MI (that is, the ‘Spirit’ of compassion, acceptance, partnership and evoking) would negate the ethical concerns raised to the use of MI in the veterinary field. If abiding by this philosophy, veterinarians would by default be unable to employ any communication skills of influence without actively promoting the welfare of client and animal (compassion), grounding their consultation in the views and needs of the client (partnership), drawing out ideas from the client on change rather than imposing their own (evoking) and respecting the autonomy of the client in decision making processes (acceptance).

7.4.1.2 *The ethical acceptability of promoting the welfare of a third party using MI*

Motivational Interviewing is employed in myriad contexts, stretching beyond its foundations in addition treatment to those such as offender rehabilitation (McMurrin, 2009), environmental inspection (Forsberg, Wickström and Källmén, 2014) and educational psychology (Atkinson and Woods, 2003). However, the use of MI to enhance the welfare of a third party such as an animal or a child (Leask *et al.*, 2012) in triadic interactions involving an advisor, care-giver and dependent is, to this author’s knowledge, infrequent within the methodology. The intention to adopt MI in a triadic interaction to influence farmer behaviour for the welfare of a third party (the cow) therefore demands ethical consideration, given the potential conflict of this scenario with ‘traditional’ MI carried out in a dyadic interaction between an advisor and client (pursued for welfare of the individual engaging in the communication interaction).

In dyadic MI interactions, ethical concern is recognised to exist given that advisors often have an aspiration for positive change in their clients that the client may not share (e.g. reduction in alcohol consumption) when a client is ambivalent or uninterested in positive change (Miller and Rollnick, 2012). As uneven power is involved in these interactions (one person can/will have influence over another), Miller and Rollnick (2012) identify core values of medical ethics as central to MI use: (i) autonomy - the freedom of your

client to make informed choices without coercion or undue influence; (ii) beneficence - providing benefit to clients by contributing to and promoting overall welfare and health; (iii) justice - providing fair and equitable access to both the benefits of treatments and protections against risk - and (iv) non-maleficence - forbidding action (or inaction) that will harm or reasonably bring about harm to clients. Additionally, specific practical guidelines for enacting these values in MI are highlighted by Miller and Rollnick (Appendix 20).

To integrate and activate these ethical principles within the practice of MI, these principles are embodied through the adoption of MI Spirit as a guiding principle of practice when interacting with clients (Chapter 1). It is in the enactment of MI Spirit (composed of compassion, acceptance, partnership and evoking; Miller and Rollnick, 2012) that a conflict between MI and the triadic encounter becomes apparent; namely, how an MI advisor can truly practice compassion and acceptance for their client (recognising and prioritising their individual welfare and autonomous choice) when they are also motivated to promote the welfare of a third party (an animal or child whose needs may conflict with the client's desires) in the interaction.

On closer consideration, however, this triadic consideration is perhaps already occurring within the traditional dyad; as Miller and Rollnick (2012) recognise, there are many instances where the client in a dyadic interaction is seeking treatment *precisely because of* their social connection(s) with third parties, where the person desiring change is not the one seated in the consultation room but another party - such as a parent, school or court system - asking for positive change in that person. In these dyads, the performance of MI is completed in the knowledge that the fundamental catalyst was *the welfare of another party*, only in this instance the benefit of the MI process to the third party (e.g. safer home environment, reduced relationship stress) is seen as *tangential* to the benefits of the dyadic interaction to the individual (e.g. reducing alcohol consumption, helping them manage their aggressive behaviour).

The issue with adopting MI for the benefit of a third party (animal, child or other dependent) therefore appears to be locked in the semantics of this phrase; to use MI (and acknowledge the potential for influence) *for* a third party infers a *purpose-driven* effect on this third party, rather than a tangential one as in 'traditional' MI dyads. However, if the interaction between advisor and animal care-giver is truly MI-adherent and within the

Spirit of MI, whether this outcome is purpose-driven or tangential is not ethically relevant. For the veterinarian consulting with a farmer on his/her herd, provided the behaviour that positively enhances cow welfare truly aligns with the farmer's own motivation, the farmer has autonomous choice, is an active participant in the change consultation and the reasons for engaging with the behaviour are their own, the ethical premise of MI is not violated. Additionally, for MI to 'work', these conditions of MI Spirit *must* be manifest in an interaction (Miller and Rollnick, 2012); so, by definition, appropriate ethical engagement with a farm client is a pre-requisite to successfully promoting cow welfare using MI. Given that cattle welfare is linked to myriad personal motivators reported by dairy farmers (e.g. pride in the herd, desire to be a good farmer, public image, finances; Leach *et al.*, 2010a), it is easy to conceive of an MI interaction where abiding by MI Spirit is possible.

However, if the influence of MI in triadic interactions is *purpose-driven* towards the welfare of third party, arguably the ethical concern in this interaction is the need for the tenets of MI Spirit to also extend to the third party (as a recipient of influence alongside the client). In the context of herd health, this can be achieved through promotion of the scientific ideal of animal welfare via the five freedoms (McCulloch, 2013) - freedom from hunger and thirst, freedom to express natural behaviour, freedom from discomfort, freedom from pain, injury and disease and freedom from fear and distress - representing what a dairy cow might 'choose' if autonomously able, therefore being worthy of compassionate pursuit. Interestingly, this duality of care for client and animal already exists within the UK veterinary oath, where the welfare of the care-giver and animal must be pursued in tandem:

"I promise and solemnly declare that I will pursue the work of my profession with integrity and accept my responsibilities to the public, my clients, the profession and the Royal College of Veterinary Surgeons, and that, above all, my constant endeavour will be to ensure the health and welfare of animals committed to my care." (RCVS, 2018a)

This suggests that veterinarians are well equipped to adopt and implement MI Spirit within the complexities of triadic ethical decision making, as this ethical complexity is built into the very professional framework that already guides their pursuit of influence.

7.4.2 Practical considerations on the adoption of MI

The potential for varied utilisation of MI within the herd health paradigm was evidenced by the diverse consultations (n=31) that made up the MI feasibility study data set. Veterinarians were asked to record ‘any discussion for the benefit of herd health’ for the purposes of communication analysis but were not restricted in their choice of discussion topic or consultation location. Whilst some veterinarians clearly ‘set aside’ advisory time in a quiet location, with the duration of their recording not interrupted and the audio clarity of the recording consistent, other advisory interactions were carried out during farm walks with clients or interspersing routine fertility checks on the herd. As such, it appeared that discussion on behaviour change permeated a variety of on-farm tasks.

This variability was also reported in Chapter Four, where advisory communication was expected to informally pervade all points at which the veterinarian was present on farm. Most typically, during - and often inextricable from - the practical obligations of cow- or herd-specific tasks (such as pregnancy diagnosis checks), but also permeating any point of the visit from the veterinarian exiting their vehicle at the beginning to climbing back in at the end (whether preparing equipment, cleaning boots, walking the farm, drinking tea in the office etc). As such, there appear to be myriad opportunities for integration of MI for cattle veterinarians in their daily practice when advisory communication is due to occur.

What may act as a practical limitation to the adoption of MI is, perhaps, not the practical remit of the advisory paradigm on farm, but practical restrictions on the very training and training enrichment processes that would be required to ensure veterinarians are proficient in the methodology and maintain their skill set over time. The feasibility trial of this thesis highlighted that for uptake of MI-critical skills facilitating farmer change talk (such as seeking collaboration, emphasising autonomy and affirming the farmer) and manifesting SDT in the interaction, longer training experiences are likely to be necessary. Additionally, to avoid skills drift, further training enrichment such as coaching and feedback are essential (supported by wider literature; (Miller and Mount, 2001; Miller and Moyers, 2017). In this author’s experience, given the relative ‘novelty’ of this training methodology to the veterinary context, engaging well-recognised industry training bodies with sufficient training time is difficult; there is currently a perception that MI can be learnt proficiently in a short time frame. Unfortunately, one thing ‘MI is not’ is easy to

learn (Miller and Rollnick, 2009), and a single workshop approach to clinical training may even serve as a ‘kind of inoculation against further learning’, where clinician self-efficacy is inflated without altering verbal behaviour enough to improve client outcomes (Miller and Mount, 2001). This practical limitation on training is, therefore, significant.

However, it is possible to be optimistic, given industry recognition of the need for a paradigm shift in communication towards a service built on partnership and collaboration (Vet Futures Project Board, 2015), combined with support for the need for ethically appropriate influencing to enhance veterinary promotion of animal welfare (British Veterinary Association, 2016). Opportunities and invitations for this author to speak on this topic by charity, industry and academic sectors are frequent and have increased in frequency throughout this PhD, suggesting interest in the MI methodology from those in animal health and welfare advisory roles is growing. The true test of MI’s applicability and feasibility will ultimately be the uptake and dissemination of research and training by other individuals and organisations over the coming decade. Given the level of worldwide dissemination of the MI methodology across human health fields with virtually no centralised effort to promote, market or advertise the methodology - likely due to MI addressing a very common and often frustrating issue in advisory services (a client’s reluctance to change despite advice to do so) (Miller and Moyers, 2017) - it is reasonable to be optimistic that MI will find a place within the veterinary advisory paradigm.

7.5 Directions for further study: small animal advisory paradigm

This thesis has explored in detail the herd health advisory paradigm, given the ‘battle ground’ on behaviour change that is perceived to negatively affect the cattle veterinarian’s advisory role to dairy farmers in the UK (Ruston *et al.*, 2016). However, potential issues with veterinary communication and inspiring client behaviour change are certainly not limited to this area of veterinary practice. Whilst there may be important distinctions between the type of consultation typified in small and large animal settings, what is common to both are the influence of the communication approach, the intricacies of human behaviour and the struggles ambivalent clients face when enacting complex change.

Veterinary communication in small animal practice is largely directive in style (Shaw *et al.*, 2004; McArthur and Fitzgerald, 2013) with communication patterns predominantly reflecting a paternalistic approach to veterinarian-client interactions (Shaw *et al.*, 2006).

These features create the same potential for client disengagement with advice discussed in the large animal setting (Chapter One), given ambivalent clients' experience of psychological reactance (Dillard and Shen, 2005) in advisory interactions in addition to the conflict of this approach with SDT motivational needs, which include autonomy, relatedness and competence (Ryan and Deci, 2000). Indeed, the potential of existing communication behaviours to have negative implications for compliance is suggested by Shaw (2004), given that veterinarians are missing communication opportunities to build trust and rapport, encourage client participation, gather accurate information and ensure client satisfaction (Shaw *et al.*, 2004). These issues may be a contributing factor to the low levels of compliance witnessed in a wide range of small animal settings, such as senior screenings, dental prophylaxis and therapeutic diets (Abood, 2007). Given the ethical obligation to protect animal health and welfare via the veterinary oath (RCVS, 2018a) the small animal context similarly demands attention and intervention in the pursuit of client engagement with behaviour change.

Indeed, in Ballantyne and Buller's (2015) qualitative analysis of the veterinary advisory role in companion animal behavioural consultations, the challenges most frequently cited by veterinarians (n=77) within the veterinarian-client relationship were issues relating to behaviour change (motivating clients, modifying expectations or goals, client ambivalence and resistance to change), compliance (promoting commitment and consistency) and client understanding of change (influencing client beliefs, opinions and ideas on aversive training methods). The correspondence of these features to the explicit foci of MI were not lost on Ballantyne and Buller (2015), who concluded that '*additional training in conflict management and motivational interviewing may improve the communication skills of veterinary behaviour teams and could potentially improve treatment adherence and outcomes*'.

When looking to client desires for veterinary services in small animal practice, the need for mutualistic communication and a strong relational foundation underpinning veterinary interactions is also evidenced (Englar, Williams and Weingand, 2016), congruent with desires noted by farm clients in Chapter Four. In a focus group study of dog (n=6) and cat (n=7) owners, Englar, Williams and Weingand (2016) reported that shared decision making (collaboration) and relationship-centred care contribute to a positive veterinary experience for companion animal owners, with owners prioritising the skills of reflective listening, empathy, open-ended questions and unconditional acceptance (i.e. having have

their opinions listened to, heard and considered and not being judged for their mistakes). This prompted Englar, Williams and Weingand (2016) to note the connection between these characteristics and the client-centred therapy of Carl Rogers, the therapeutic method from which the MI methodology evolved (Miller and Moyers, 2017). Whilst the technical component of MI is directional in a way that client-centred therapy is not, the relational component of MI '*rests explicitly in Carl Roger's approach*' (Moyers, 2014), suggesting adoption of MI by small animal veterinarians would meet clients' desires for veterinary services in the small animal context.

The applicability of MI to the small animal advisory paradigm is therefore salient; similar challenges in veterinary communication and inspiring client behaviour change are witnessed, coupled with clients' desire for a more client-centred focus in veterinary consultations. Additionally, existing research suggests that small animal veterinarians show flexibility in communication styles; whilst a paternalistic communication style dominated small animal consultations (n=300) studied by Shaw and colleagues (2006) most veterinarians (n= 50) showed the capacity to vary their communication approach and adopt both a paternalistic and client-centred communication style, although whether this was achieved consciously or unconsciously by the study sample was unknown. This existing flexibility suggests that adoption of an MI style in appropriate consultations (where the client is ambivalent about the decision to change) could be readily achieved by veterinarians in practice.

In addition to highlighting feasibility of uptake, this consultation flexibility observed by Shaw and colleagues (2008) also evidenced the specific veterinary-client appointment type in which MI may be of (most) potential benefit in the small animal paradigm. Veterinarian communication observed by Shaw and colleagues (2008) was significantly associated with consultation type, with problem-orientated consultations (a veterinary encounter with a dog, cat, or small mammal experiencing a health-related problem) more likely to elicit a paternalistic veterinary communication approach, whilst wellness appointments (veterinary encounters with a presumably healthy juvenile, adult or geriatric dog, cat, or small mammal) were more likely to elicit a client-centred communication approach (Shaw *et al.*, 2008). Concern was raised by Shaw and colleagues (2008) that, as a result, adherence to veterinarian recommendations could be damaged in problem-orientated consultations, due to veterinarians neglecting to address

and explore the social and lifestyle concerns of their clients that could impact animal management.

In consequence, MI training may be of particular utility to help small animal veterinarians adjust their communication approach in appropriate problem-orientated consultations (i.e. non-emergency; Shaw *et al.*, 2006), as these consultations are potentially more likely to evoke a paternalistic style given the immediate perceived need to ‘fix’ something for the client. MI offers the skill set and philosophy to be both goal-orientated and client-centred (Miller and Rollnick, 2012) so is particularly appropriate to enhance this interaction, but it is a communication style that is difficult to attain in the absence of specific training, coaching and practice (Miller and Rollnick, 2009). With MI’s focus on integrating the client’s individual, social and lifestyle concerns through the exploration and resolution of ambivalence (Miller and Rollnick, 2012), veterinarians trained in MI are also equipped with skills to ‘*more accurately locate the source of the [animal health and welfare] problem and care for the total health of the animal*’ (Shaw *et al.*, 2008), enhancing patient outcomes. The applicability and feasibility of MI training in the small animal paradigm is therefore a research topic worthy of scientific exploration.

7.6 Final conclusions

This thesis has explored in detail current cattle veterinarian communication approaches in the pursuit of behaviour change, the nuances implicit in the (UK) herd health advisory paradigm and the applicability, feasibility and contextual appropriateness of the MI methodology in this context, given the ‘battle ground’ on behaviour change that is perceived to negatively affect the cattle veterinarian’s advisory role (Ruston *et al.*, 2016). The results suggested deficits exist in current veterinary communication on herd health, which could meaningfully be attended to through the integration and adoption of more MI-consistent communication methods when communicating on complex change topics. Additionally, exploration of the herd health paradigm suggested a good fit with the MI methodology, given the explicit emphasis on relational attributes of the veterinarian-farmer advisory interaction. Feasibility testing of MI suggested that significant improvements in veterinary communication in the pursuit of behaviour change could be achieved with brief training, which in turn enhanced farmer engagement in advisory interactions on farms.

As the outcomes of this thesis are questions of feasibility - whether MI could enhance current cattle veterinary communication, could co-exist with the existing herd health advisory paradigm and could be practically employed by cattle veterinarians - further research is needed to complement, validate and advance this research topic. A full research intervention with more information is needed, including, but not limited to: a greater sample of veterinarians and farmers, integrating greater training time and training enrichment (coaching, feedback, follow-on training), the ability to sample more and varied behaviour change consultations and opportunity to explore resultant behaviour change. This author is supporting such research being carried out at the Swedish University of Agricultural Sciences (*‘Motivational interviewing as a means to decrease antimicrobial drug use in animal production’*), ensuring the lessons and insights from this PhD research do not languish in the archives of science.

The strength of this thesis is in the conscious attention to diverse scientific literature, disciplines and research methodologies to determine how - and under what circumstances - UK dairy farmers engage with advisory recommendations on change and to explore the efficacy of MI communication as a mechanism of farmer engagement and inspiration. Additionally, this research is both novel - as the first exploration of MI in the veterinary realm (to this author’s knowledge) - and timely, given demand for a change in the veterinary role from *‘from a hierarchical model with the vet as the expert imparting instruction, to one centred on partnership with empowered clients and other veterinary-related professionals’* (Vet Futures Project Board, 2015). This thesis adds to a body of literature on farm animal veterinary communication that is, at present, in its infancy, creating a solid foundation for focused future efforts to further explore both the herd health advisory paradigm and examine the applicability of MI in the veterinary realm.

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Appendices

*“When we are no longer able to change a situation -
we are challenged to change ourselves”*

Viktor E. Frankl

Appendix 1

Role play scenario provided to actress: farmer background (pg. 217-222)

General information

Farmer style

You have set opinions on how to run your farm- after all, it is a family farm and you have built up your knowledge over a life-time. However, you have a good relationship with your vet and trust that they are trying employ their knowledge to help you make the right decisions. You don't feel you have a lot of money or time to spare, so you can be a little defensive about the thought of having to spend more or carry out more tasks if the direct benefits aren't clear. As such you can seem a little uncooperative, but you care deeply for your cows and take pride in keeping your herd healthy, and this ensures that you are invested in herd health discussions. You *are* willing to implement changes to your management, but need to be pretty sure that any new action will be worthwhile to consider employing it. You are much more willing to consider new ideas on herd health when you have the chance to express your personal opinion and knowledge in discussions. However, you only engage in this way if encouraged by the vet.

Daily life

You are a typical dairy farmer- long and busy days with the help of your partner and (occasional) farm hand. You also have two young children (aged eight and ten) which means you don't want to add any more to your hectic routine.

5.00 Get up

5.30 Milking, cleaning cattle sheds (scraping floors of muck, checking bedding)

7.30 Clean up, feeding calves/ young stock

8.30 Breakfast

9.30 Feed the cattle, check non-milking herd in pasture, other jobs required that day (such as fixing fencing and machinery, organising feed deliveries, foot trimming, office admin)

1.00 Lunch

1.45 Whatever wasn't finished before lunch!

3.30 Pick up the children from school

4.00 Milking, cleaning cattle sheds (scraping floors of muck, checking bedding)

6.00 Clean up, feeding calves/ young stock

7.00 Head in for dinner

Also, if you are expecting one of your herd may be calving imminently, you will often check once or twice through the night to make sure there are no problems.

Farm details

General

- You are a family run dairy farm in England, 123 pedigree Holsteins are milked, with an average 7,700 litres per cow/year.
- The farm is run by you and your partner, with a relief milker three times a week.
- A single member of staff works in the parlour each milking.
- All cows are milked twice daily at 5.30am and 4.30pm. The milking order is low yielding cows, high yielding cows and then the sick / fresh calved animals.
- The majority of cows calve over winter.
- All service is by artificial insemination (AI), with a mixture of sexed, normal, and fertility plus semen used.
- Replacement heifers are homebred, dairy bull calves are sold within 6 weeks of birth, some beef crosses are kept and sold as stores.
- The milking herd consists of 34 1st lactation, 18 2nd lactation and 71 3rd+ lactation animals.

Housing

NB This shed was replaced within the last five years- you are unlikely drastically amend it!

- Cows are housed in a cubicle shed over winter.
- The shed comprises a central feed passage with a feed face either side.
- Cubicles are then two rows, back to back either side of this.
- The row of cubicles behind the feed face are open fronted, those opposite this are closed at the front by a breeze block wall.
- Passages are grooved concrete based, and scraped with automatic scrapers, these run nine times a day.
- Cubicles comprise cantilever cubicles, the base is rubber mats with wood shavings on top.
- These are generally refreshed once daily (sometimes you are too busy!)
- There are always more cubicles than cows and measurement of the cubicles suggests they are appropriate in size.
- However, cow comfort quotient was approximately 60% (target 85%); this is an assessment of cubicle comfort, assessed by proportion of cows lying properly in cubicles divided by cows in cubicles but not lying.
- In summer low yielding cows are turned out to grazing, the high yielding group remain housed.
- Housed cows are fed a partial mixed ration based on grass and maize silage, formulated for a high yielding and low yielding group, and topped up to meet yield with concentrate feed in the parlour.

Routine foot health management

Foot trimming

- Farm procedure is that that every cow receives routine foot trimming of all four feet at drying off, performed by lay foot trimmer, a member of the National Association of Cattle Foot Trimmers (NACFT).
- The foot trimmer would attend approximately once a fortnight in the summer and trim any cows due to dried off imminently.
- You're not able to establish if every cow receives a foot trim at drying off; it is possible some are missed.

Foot bathing

- Foot bathing of all milking cows is performed approximately once a week.
- Cows pass through a single foot bath containing 2% formalin as they exit the parlour, no pre-washing of feet occurs.

Lameness detection and treatment

Detection

- Lameness is detected by visualisation of abnormal locomotion or weight bearing while performing daily tasks.
- Any cow detected as lame is mentioned to a vet at routine visits, cause of lameness and treatment is recorded by the vet and kept on the farm's computer-based database (Interherd)

Lameness prevalence

- The herd prevalence worsens over winter and improves after turnout.
- You estimate they have three severely lame (score 3) cows, and eight moderately lame (score 2) cows.

Cause of lameness

- The most common cause is sole ulcers (vet records indicate 25 cases per 100 cows per year).

Milking routine

- Cows enter the parlour quietly and easily.
- Milkers do not wear disposable gloves.
- Teats are dipped post-milking in an iodine-based teat disinfectant (95% are adequately covered).
- No pre-milking disinfectant is used.
- Cows generally stand quietly during the milking.
- There are generally no incidences of air sucking or clusters kicked from the udders.
- A separate unit and dump bucket is used to milk freshly calved and clinically mastitic cows. *Although there are two separate buckets they are not clearly labelled and it is considered likely that they would frequently be used for both fresh calved and clinical cows.*
- The unit is disinfected with per-acetic acid after most uses.

Milking plant

- The current parlour was installed in 2008 and is a 24/24 design (12 units each side). The exterior of the plant is volume washed after milking with detergent used once per week. A wash /disinfection cycle runs after every milking.
- The plant is serviced twice per year. Hours of use are monitored automatically and liners are changed as required after a set number of hours (estimated around 2000).

Clinical mastitis

- There has been a long history of a high rate of clinical mastitis at the home farm site.
- Repeat cases (where mastitis occurs repeatedly in a single quarter) are a particular concern.
- Treatment records from 2014 indicate 81 treatments / 100 cows / year.
- 19% repeat cases (e.g. from a quarter treated already in that year).
- 70% occurred in cows in the 3rd lactation or older.
- The majority of clinical cases occurred in mid lactation.

Sub-clinical mastitis

- The prevalence of infected cows in the last 12 months has fluctuated between 15 and 22%.
- The prevalence of infection was 8% in 1st lactation animals, 10% in 2nd lactation animals and 40% in older animals.

Mastitis culture results

- 55 individual quarter sterile milk samples were collected from high somatic cell count cows at the visit. From these a total of 60 positive bacterial cultures were obtained.
- There are slightly more 'environmental' bacteria than contagious bacteria, although both are present in high numbers.

Dry cow therapy

- All cows receive intra-mammary antibiotics at dry off

Risk factors

Lameness

These cannot be changed as you perceive they underpin productivity of business

- High yielding cows.
- Housing cattle over winter.

Other

- Presence of automatic scrapers at your farm.
- Speed of treatment: you don't always treat cows quickly after identifying lameness.
- You house your cattle for over 60 days at a time.
- Your cattle cubicles- cubicle yards are associated with a higher rate of sole ulcers (although you can't afford to change this!)
- Your 'comfort quotient'- more cows are standing rather than lying in the housing area than is ideal. Increased standing times has been associated with an increased incidence of sole ulcers.
- Your bedding system: you don't tend to put a very deep bed down and may miss refreshing the bedding some days. This could be a cause for your cows not choosing to spend time lying down.
- You only foot trim once a year, and hope that all cows are seen (you're not entirely sure 100% are attended to by the foot trimmer). Sole ulcers are less likely to develop with regular foot trimming, for example if carried out every four months.
- Your foot bathing protocol: you only carry this out once a week.

Mastitis

- You had a low number of replacements entering the herd last year, meaning it was necessary to keep older (infected) cows in the herd.

However, you have discussed this with the previous vet, and have implemented a plan to improve your replacement rate.

- Spread in the parlour is likely, due to your hygiene practices (not using gloves, not dipping teats prior to milking).
- Lack of consistency in bedding cleanliness could also be a contributing factor.

Lameness control: your viewpoints

Management changes you are aware of

- You could ensure bedding is refreshed daily.
- You could put a deeper bedding down.
- You could train to be able to carry out foot trimming yourself, to enable quicker treatment.
- You could bring in your external foot trimmer more regularly and aim to treat the cows multiple times a year.
- You could allocate time to mobility score your cattle each week, to ensure you catch and treat lameness at an early stage.
- You could amend your foot bathing protocol to a more regular interval.

Positives

- The benefit of treating lame cows early makes sense, as you don't want your cows to be in pain and you care deeply about their health and welfare.
- As your farm is a family business, having healthy cows gives you a sense of pride.
- As your shed was replaced within the last five years you don't want to make drastic changes, but you are open to bedding options how these relate to lying comfort as these are a fairly simple measure.
- You would be willing to explore options to change foot trimming practices and foot bathing IF you feel the vet has been sympathetic and explored your concerns over time and finances.

Negatives

- You feel that a few severely lame cows is fairly normal for your size herd (compared to other farmers you know). You think you have three.
- You think you have eight score 2 cows (moderately lame).*
- You don't currently really think lameness has a huge economic impact on your farm (but could be convinced).
- Mobility scoring your herd at regular intervals- to pick out the less obvious signs when lameness first begins - will require a concerted effort.
- The additional effort feels like quite a barrier for you. Keeping on top of milking and daily management routines already requires long and tiring days, and as you are a family business days off are few and far between.
- You are resistant to the fact that you need training in mobility- after all you see your cows every day and know each one. (However, if the vet is engaging and appeals to your sense of pride in their health and/or welfare, you might be willing to consider their opinions on lameness detection and early treatment).

Sensitive information

- You've thought before about being more rigorous in lameness detection as you had to cull a good cow last year. This was upsetting for you as you felt you might have had a different outcome if you acted differently.
- Also, you do take the severely lame cows to heart as your children are able to identify that they are sick, which brings it home for you. Underneath your practical objections you are therefore motivated to change.
- However, **admitting these two facts is not easy for you as they are more personal. You would have to feel very comfortable with the conversation to discuss these aspects with the vet.**

**Often farmers underestimate the number of lame cows in their herd; it is likely that you are missing some score 2 cows in your assessment. The vet might suggest this to you.*

Mastitis control: your viewpoints

Management changes you are aware of

- You could start wearing gloves during the milking process.
- You could start using a pre-milking disinfectant dip.
- You could employ more extensive cleaning of the environment (stalls, alleyways, cubicles).
- You could carry out frequent tests on the cows yourself, like that California Mastitis Test, to identify high cell count quarters that might be treated.
- You could take part in the DairyCo Mastitis Control Plan to try and identify in detail the aspects of your farm that need attention.

Positives

- You are already addressing the high number of older cows in your herd already, and are working to improve the replacement rate.
- The benefit of reducing mastitis makes sense, as you don't want your cows to be in pain and you care deeply about their health and welfare.
- As your farm is a family business, having healthy cows gives you a sense of pride.
- You also know that their productivity is affected by mastitis, in addition to you milk price, so reducing it will help you financially in the long term.
- You would be willing to explore options to improve bedding and milking practices IF you feel the vet has approached your current issues sympathetically.

Negatives

- You have tried out individual management changes in the past (such as trying to put down fresh bedding every day).
- These didn't seem to have a drastic effect on your somatic cell count when you kept on top of them.
- This was disheartening (although if you feel comfortable in the conversation, you might admit that you implemented these inconsistently).
- You are troubled by the considerable demands on your time and the finances you feel it will take to make progress in reducing your cell count. For example, better parlour hygiene will take more time and cost more.
- You are worried that much of the control measures for mastitis are general advice and might not work on your farm.

Sensitive information

- You *are* actually willing to try something new as you realise that in the long-term investment in mastitis reduction should pay off financially, and money can be a struggle.
- You know that it is possible to have a lower somatic cell count on your farm as five years ago you were achieving significantly below the level you are at today. This is upsetting as you feel you should know how to fix the problem, but can't put your finger on any huge change in your management. Being able to assess everything objectively is difficult!
- However, **admitting these two facts is not easy for you as they are more personal. You would have to feel very comfortable with the conversation to discuss these aspects with the vet.**

Appendix 2

Role play scenario provided to veterinarians: mastitis

You have visited a 123-cow pedigree Holstein farm to carry out routine fertility testing. You have not been to this farm before, but a member of your practice (John Walters) has retired, so you will be taking on this farm going forward.

During a general discussion on herd health, the farmer mentions that they are unhappy with the penalties they keep having to pay as a result of their bulk milk somatic cell count (330,000 cells/mL). You are aware of some risk factors on the farm (cows are dirty, no pre-dipping or fore-stripping is done, alleyways are not scraped often enough and the backs of cubicles are not cleaned regularly, etc.), and you suspect there might be other areas that you haven't observed that also need attention.

You decide to discuss this with the farmer in order to advise on reducing mastitis within their herd. You would like them to change their approach to mastitis management and employ the Mastitis Control Plan, as you feel this would be an effective way to address risk factors on this farm, as supported by Green et al. (2007).

M. J. Green, K. A. Leach, J. E. Breen, L. E. Green, A. J. Bradley. National intervention study of mastitis control in dairy herds in England and Wales. *Veterinary Record*. 160: 287-293.

- An intervention study was carried out on 52 dairy farms in England and Wales to determine whether the implementation of a well-specified mastitis control plan in herds with an incidence of clinical mastitis of more than 35 cases per 100 cows per year would reduce the incidence of clinical mastitis, and also reduce the incidence of increases in the somatic cell counts of individual cows.
- The herds were randomly allocated to receive the plan either at the start of the study (intervention herds) or after one year (control herds).
- After one year there was a significant 22 per cent reduction in the proportion of cows affected with clinical mastitis on the intervention farms compared with the control farms.
- There were also significant reductions of approximately 20 per cent in the incidence of clinical mastitis and in the occurrence of increases in the somatic cell counts of individual cows from below, to above 200,000 cells/ml.

Appendix 3

Role play scenario provided to veterinarians: lameness

You have visited a 123-cow pedigree Holstein farm to carry out routine fertility testing. You have not been to this farm before, but a member of your practice (John Walters) has retired, so you will be taking on this farm going forward.

When moving the cattle through the race, you notice three animals whose mobility you would classify as severely lame. This sets off alarm bells for you about the level of lameness in the herd. John mentioned that the farmer has had to cull as a result of this problem before, and that there are some issues with routine foot health management (trimming/bathing) and general husbandry (mainly bedding depth and frequency of provision).

You decide to discuss this with the farmer in order to advise on reducing lameness within their herd. You would like them to change their detection and treatment of lameness, as you feel a more proactive approach (mobility scoring every two weeks and treating within 48 hours) would be an effective management change for this farm, as supported by Leach et al. (2012).

K.A. Leach, D.A. Tisdall, N.J. Bell, D.C.J. Main, L.E. Green. The effects of early treatment for hindlimb lameness in dairy cows on four commercial UK farm. *The Veterinary Journal*. 193:626–632.

- An ‘early threshold’ protocol for treating cows within 48 h of being detected lame in one or more hind limbs at fortnightly mobility scoring was tested on a randomly selected group of cattle on four commercial dairy farms.
- The outcomes of the early threshold treatment for first cases of lameness were compared with those of the farmers’ conventional approach to treatment.
- The early threshold schedule resulted in a much shorter time to treatment than the conventional approach.
- The early threshold group presented with less severe foot lesions and cattle were less likely to be selected for further treatments by the farmer than conventionally treated cows.
- Early threshold treatment reduced the prevalence of lameness four weeks after treatment, compared with controls.

Appendix 4

Farmer pilot interview schedule

1 Basic information

- 1.1 How many years have you been in farming? With this herd?
- 1.2 What size is the herd here?
- 1.3 What is your production system? (organic/conventional, intensive/extensive)
- 1.4 What (if any) certification scheme are you a part of?
- 1.5 Are you affiliated with a particular company?
- 1.6 Could you tell me about the history of the herd, what led it to the size/production/scheme it is now?

2 Lameness and mastitis

- 2.1 Can you tell me about your experience of lameness on this farm?
- 2.2 Can you tell me about your experience of mastitis on this farm?
For both: Prompt for details such as current/historical severity, treatment, management positives and negatives, whether they've made management changes recently.
- 2.3 What are your goals with both these diseases?
i.e. Do they want change (if so what?) or are they happy with how things are (if so why?).

3 Veterinary role on farm

- 3.1 How long has (vet name) been the vet on this farm?
- 3.2 How long have you been working with him/her?
- 3.3 What is your relationship like?
- 3.4 When would you typically discuss lameness and mastitis?
Prompt for whether this is typical on a regularly scheduled visit or reactive to incidence, and whether conversations occur during other tasks or do they allocate time to talk through these things (is the vet paid by total time spent on the farm?).
- 3.5 How does the vet approach these topics with you?
Prompt for communication style: how does the vet talk about the issue?
e.g. Lots of advice giving and questions, or is the vet curious about their thoughts/decisions
- 3.6 If you could choose three words to describe your vet's communication style, which would you choose?
- 3.7 When you need to decide on a course of action (treatment, change in management), what kind of information do you discuss in decision making?
e.g. Clinical information on the cow(s), farm specific factors (e.g. practicalities), their opinions/goals, the vet's comparative experience on other farms, vet's knowledge of animal welfare
- 3.8 In decision making, how do you balance your opinion and (vet name)'s opinion?
Prompt for is the vet empathetic to their opinion, what happens if there is a conflict of opinion, are actions based on their ideas, those of the vet, or both.
- 3.9 How do you feel about the advisory recommendations (vet name) gives as a result of these discussions?
Prompt for are they always easy to follow, are they always relevant to their management style.
- 3.10 Do you implement all the advisory recommendations (vet name) makes? (Yes/No/Some)
- 3.11 Could you tell me a little about why this is?
Prompt for factors about advice/advisory process that might influence this (practicality, perceived importance, motivation).
- 3.12 What would motivate you to implement more of their advice?
Potentially bring up areas discussed in previous section.

4 General veterinary discussion

4.1 What should the role of a cattle vet be on farm?

Veterinary advice, welfare advice, service provider, friend, business associate...

4.2 Overall, what qualities do you think make the ideal cattle vet?

4.3 If you had to talk about your farming experience to a newly graduated vet, what advice would you give them on how to approach discussions on issues such as lameness and mastitis?

4.4 If you had to talk about your farming experience to a newly graduated vet, what would you tell them are the typical barriers to the uptake of veterinary advice on lameness and mastitis?

4.5 If you could describe ideal veterinary communication on herd health in three words, what would they be?

Appendix 5

Veterinarian pilot interview schedule

1 Basic information

- 1.1 How many years have you been a vet?
- 1.2 How many years have you been a cattle vet?
- 1.3 How many years have you been the veterinarian for this herd?
- 1.4 How long have you been working with (farmer name)?
- 1.5 Could you tell me about the history of the herd, what led it to the size/production/scheme it is now?

2 Lameness and mastitis

- 2.1 Can you tell me about your experience of lameness on this farm?
- 2.2 Can you tell me about your experience of mastitis on this farm?
Prompt for details such as current/historical severity, treatment, management positives and negatives, whether they've encouraged management changes recently.
- 2.3 What are your goals with both these diseases?
i.e. Do they want to/think they can eradicate them or bring them to an 'acceptable' level, or are they happy with how things are (if so why?).

3 Veterinary role on farm

- 3.1 What is your relationship like with (farmer name)?
- 3.2 When would you typically discuss lameness and mastitis?
Prompt for whether this is typical on a visit or reactive to incidence, and whether conversations occur during other tasks or they allocate time to talk through these things (do they get paid by total time spent on farm?).
- 3.3 How does you approach these topics with (farmer name)?
Prompt for communication style: how do they talk about the issue?
e.g. Lots of advice giving and questions, or are they curious about the thoughts/decisions of the farmer.
- 3.4 If you could choose three words to describe your communication style, which would you choose?
- 3.5 When you need to decide on a course of action (treatment, change in management), what kind of information do you discuss in decision making?
e.g. Clinical information on the cow(s), farm specific factors (e.g. practicalities), opinions/goals of farmer, their comparative experience on other farms, their knowledge of animal welfare.
- 3.6 In decision making, how do you balance your opinion and (farmer name)'s opinion?
Prompt for the typical approach they would take, strategies they use if there is conflict, are actions based on their ideas, those of the farmer, or both.
- 3.7 How do you feel about the advisory recommendations you give as a result of these discussions?
Prompt for do they think they should be easy to follow, do they fit with what they know of (farmer name) management style, are they confident they will be carried out.
- 3.8 Does the farmer implement all the advisory recommendations you make? (Yes/No/Some)
- 3.9 Could you tell me a little about why you think this is?
Prompt for factors about advice/advisory process that might influence this (practicality, perceived importance, motivation).
- 3.10 What strategies do you employ to motivate (farmer name) to implement more of your advice?
Communication, benchmarking, incentives, etc.

4 General veterinary discussion

4.1 What should the role of a cattle vet be on farm?

Veterinary advice, welfare advice, service provider, friend, business associate...

4.2 Overall, what qualities do you think make the ideal cattle vet?

4.3 If you had to talk about your veterinary experience to a newly graduated vet, what advice would you give them on how to approach discussions on issues such as lameness and mastitis?

4.4 If you had to talk about your veterinary experience to a newly graduated vet, what would you tell them are the typical barriers to the uptake of veterinary advice on lameness and mastitis?

4.5 If you could describe ideal veterinary communication on herd health in three words, what would they be?

Appendix 6

Veterinarian communication behaviours, attributes and ethos reported as desirable or undesirable by farmers, veterinarians or both

VETERINARIAN COMMUNICATION BEHAVIOURS		
<i>BOTH</i>	<p>Listen: <i>to what the farmer says and does not say</i></p> <p>Emphasise achievements/successes/strengths</p> <p>Elicit the farmer's ideas</p> <p>Be interested</p> <p>Accessible/clear language</p> <p>Explain the 'why' and 'how' (not just 'what')</p> <p>Explicit attention to what they think/want/their opinion/concerns</p> <p>Empathy</p> <p>(Veterinarian should) offer opinion</p> <p>(Veterinarian should) provide choices/options</p>	Jargon/being overly technical
<i>VET</i>	<p>Open questions</p> <p>Accessible concepts</p> <p>Facilitate:</p> <p><i>Get farmers to come up with ideas themselves, help farmers come to own conclusions rather than telling, explore their ideas before advising</i></p> <p>Acknowledge farmer's world</p> <p>Highlight the small steps possible</p> <p>Balance veterinarian and farmer priorities</p> <p>Match advice to circumstances at hand</p> <p>Invest time</p> <p>Show evidence base</p> <p>Explain options</p> <p>Educate</p>	<p>Presenting too much data</p> <p>Preaching at farmer</p> <p>Dominating conversation</p> <p>Making snap judgements</p> <p>Criticism/ chastising</p> <p>Blaming</p>
<i>FARMER</i>	<p>Explicit attention to: what the farmer does, how and why they do it</p> <p>Right balance of questions/listening with advice giving</p> <p>Be open and clear on the reason behind the change</p> <p>Say it like it is- be direct with the truth</p>	<p>'Salesmanship'</p> <p>Not enough talk with farmer</p> <p>Not 'upbeat'</p> <p>Not conveying what's going on</p> <p>Bringing up mistakes</p> <p>Telling farmer what to do</p>
VETERINARIAN COMMUNICATION ATTRIBUTES		
<i>BOTH</i>	<p>Honesty/transparency</p> <p>Conviction/confidence</p> <p>Tact/Subtlety</p> <p>Sensitivity</p>	<p>Arrogance</p> <p>Anger</p> <p>Indifference/coldness</p>
<i>VET</i>	<p>Modesty</p> <p>Enthusiasm</p> <p>Passion</p>	<p>Accusatory</p> <p>Judging</p> <p>Rudeness</p> <p>Vagueness</p>
<i>FARMER</i>	<p>Relaxed</p> <p>Compassionate</p> <p>Fair</p> <p>Proactive</p>	<p>Condescension/'being full of own importance'</p> <p>Ignorance</p> <p>Pushy/forcefulness</p> <p>Blasé</p> <p>Cockiness</p>
VETERINARIAN COMMUNICATION ETHOS		
<i>BOTH</i>	<p>Friendly and positive attitude</p> <p>Interest in farmer situation/experience/farm/work</p> <p>Ability to tailor advice to the individual</p> <p>Trust between veterinarian and farmer</p> <p>Partnership between veterinarian and farmer</p> <p>Develop a friendship/relationship</p>	
<i>VET</i>	<p>Willingness to devote time</p> <p>Conscious of the effect of advice</p> <p>'Take your heart to work' (care)</p> <p>Must earn farmer respect: this can take years</p> <p>Dedication to keep promises</p> <p>Awareness of communication opportunities- account for farmer mood, farm triggers, time you have</p> <p>Make farmer feel valued</p> <p>Patience</p>	<p>Making assumptions about farmer/farmer wants</p> <p>Performing outside role</p> <p>Showing lack of knowledge on farm</p>
<i>FARMER</i>	<p>Easy to talk to</p> <p>Promote the business</p> <p>Know the farmer well/value the farmer as an individual</p> <p>Connecting with and being willing to educate the younger generation on farm</p> <p>Being nice</p> <p>Open mind</p> <p>Sense of humour</p>	<p>Underestimating farmer intelligence/knowledge/expertise</p> <p>Looking down on the farmer</p> <p>Making farmer feel like a fool</p>

Appendix 7

Case study: providing advice on lameness

Veterinarian: Bob the veterinarian is advising on lameness within the herd. Whilst the farmer he advises has made excellent progress with her cows that have impaired or seriously impaired mobility (Scores 2 and 3: Appendix 8), which he thinks is a result of the excellent economic case he made on the costs of lameness, the level of cases of imperfect mobility (Score 1: Appendix 8) seems to be rising. He has given advice on this over several months but is not seeing any action on behalf of the farmer to address the problem. This is pretty confusing, as based on the farmer's interest in reducing his high score cows he knows she sees lameness as a problem and is happy to take on extra effort to reduce it. Even so, each time he goes back for a fortnightly visit the extra measures they discuss (such as routine preventative foot trimming) seem go under the radar and are not acted upon, despite her reporting they all make sense to her. He worries that maybe she is blind to the problem in some ways.

Farmer: Abby the farmer had been working hard to reduce the impaired or seriously impaired (Scores 2 and 3: Appendix 8) cows in her herd. She worries about lameness as she knows it affects her cows' welfare in addition to her farm fields having a public footpath running through them, which is frequented by the local community she is a part of. It upsets her that friends report seeing these lame cows as she wanted to be seen as a good farmer. She therefore readily took on the recommendations in this area to make progress with her herd. Now that the visibly lame cows have gone, she tends to prioritise adjusting other areas of management day to day; the milk price is low and she feels she must strive to focus on the areas where there are 'big wins'. She trusts her vet and agrees his suggestions make sense, but when it comes to day to day decisions, other things just end up taking priority on the welfare front.

Why does advice fail to be meaningful? Point 2a: Here the veterinarian has a sense that he understands the farmer's world view ('I want to reduce lameness to enhance production'), as previously she has been keen and engaged with lameness management. Given this, he has kept on track with the same delivery of advice, talking through cost/benefit rationales for the new recommendations. For Abby, her world view is a little different ('I want to do as much for welfare as possible with the resources I have', 'I want to be perceived as a good farmer' and 'big wins are important right now'). For cows with

impaired or seriously impaired mobility (Scores 2 and 3: Appendix 8), the mismatch in world view perception was irrelevant as her local interpretation still leant meaning to the advice; her world view manifested meaning in ‘reducing seriously lame cows’ given the big win in costs, welfare and public perception. However, for improving cows with imperfect mobility (Score 1: Appendix 8), this world view meant less meaning was attributed to advice, as other aspects of herd health improvement would become more salient.





Solution: To engage Abby in the process of attending to cows with imperfect mobility (Score 1: Appendix 8), Bob will have to deliver the advice in a way that aligns with her world view or find a method of delivery that is sufficiently salient to reconfigure her ideas relating to this topic. Fundamental to this process is: first, understanding exactly what Abby’s world view is and challenging the assumptions he has made on why she implemented his initial recommendations. This can be achieved through active and evocative communication following the desired traits described (Appendix 6). With this new insight, Bob can work out what might catalyse how Abby configures this advice within her world view, whether relational (such as hearing from other respected farmers that reducing subclinical lameness has great impact for low effort) or delivery-orientated (using communication methods to strategically engage her sense of being a ‘good farmer’ with these actions). In this way, reducing subclinical lameness will become meaningful for Abby and is likely to lead to a change in behaviour.

Appendix 8

AHDB Definitions of Cattle Lameness Scores



AHDB Dairy Mobility Score

Category of score	Score	Description of cow behaviour	Suggested action
Good mobility 	0	<p>Walks with even weight bearing and rhythm on all four feet, with a flat back.</p> <p>Long, fluid strides possible.</p>	<ul style="list-style-type: none"> No action needed Routine (preventative) foot trimming when/if required Record mobility at next scoring session.
Imperfect mobility 	1	<p>Steps uneven (rhythm or weight bearing) or strides shortened; affected limb or limbs not immediately identifiable.</p>	<ul style="list-style-type: none"> Could benefit from routine (preventative) foot trimming when/if required Further observation recommended.
Impaired mobility 	2	<p>Uneven weight bearing on a limb that is immediately identifiable and/or obviously shortened strides (usually with an arch to the centre of the back).</p>	<ul style="list-style-type: none"> Lame and likely to benefit from treatment Foot should be lifted to establish the cause of lameness before treatment Should be attended to as soon as practically possible.
Severely impaired mobility 	3	<p>Unable to walk as fast as a brisk human pace (cannot keep up with the healthy herd).</p> <p>Lame leg easy to identify – limping; may barely stand on lame leg/s; back arched when standing and walking.</p> <p>Very lame.</p>	<ul style="list-style-type: none"> This cow is very lame and requires urgent attention, nursing and further professional advice Examine as soon as possible Cow will benefit from treatment Cow should not be made to walk far and kept on a straw yard or at grass In the most severe cases, culling may be the only possible solution.

Appendix 9

Questionnaire content provided to participants post-brief MI training experience

1 What did you like about the training?

2 What did you not like about the training?

3. What did you learn?

4. What communication skills worked on farm?

5. What communication skills didn't work on farm?

6. What amount (if any) of your CPD budget would you be willing to pay to take this training?

I.e. two clinical club sessions/one day session

£0 (I would attend if free)

£25

£50

£100

£150

£250+

7. Would you recommend this training to a colleague- and why?

Appendix 10

A summary of veterinarian verbal behaviour codes (Motivational Interviewing Treatment Integrity Code (Moyers, Manuel and Ernst, 2014) and veterinarian speech proportion) and farmer verbal behaviour (Client Language Assessment in Motivational Interviewing code; Miller and colleagues 2008) pre- and post-veterinarian training experience

Vet	Pre-training veterinarian										Pre-training farmer			Post-training veterinarian										Post-training farmer		
	MIA	MINA	OTH	QU	RE	RE per QU	%CR	REL Global	TECH Global	PvetS	CT	FW	ST	MIA	MINA	OTH	QU	RE	RE per QU	%CR	REL Global	TECH Global	PvetS	CT	FW	ST
1	0	2	7	10	0	0	0	1	2.5	56.06	2	11	0	4	6	24	19	3	0.16	33.33	1	2.5	45.78	2	40	0
2	0	17	31	22	6	0.27	0	1.5	2.5	57.78	11	40	12	11	2	14	13	11	0.85	54.55	4	4	61.34	8	17	3
3	2	7	34	42	6	0.14	33.33	1.5	2.5	70.20	11	45	11	1	5	68	32	16	0.50	12.50	2.75	3.25	55.77	37	75	5
4	0	0	58	5	3	0.60	0	2	1.5	67.19	2	57	1	0	1	9	7	7	1.00	42.86	3	4	38.09	7	18	2
5	0	11	29	13	8	0.62	0	1	2.5	75.98	9	31	2	3	10	26	27	22	0.81	9.09	2.5	2.5	55.12	17	46	7
6	12	11	31	21	6	0.29	16.67	3.5	3	77.29	11	34	7	1	3	17	39	17	0.44	70.59	5	4.5	40.20	38	47	9
7	3	3	17	5	4	0.80	50.00	2.5	3	43.99	11	29	3	4	2	27	23	3	0.13	0	2.5	2.5	54.21	10	37	2
8	0	5	10	9	8	0.89	25.00	3	3	46.13	8	19	6	4	4	17	22	9	0.41	0	4.5	4	55.98	24	20	1
9	0	3	17	14	3	0.21	33.33	1.5	2.5	72.05	8	20	1	4	0	17	16	20	1.25	50.00	5	4.5	46.36	40	26	3
10	0	12	21	23	5	0.22	40.00	2	2.5	66.54	12	33	5	2	9	12	9	10	1.11	50.00	4	4.5	56.42	27	9	8
11	0	14	47	6	4	0.67	0	1.5	2.5	83.09	7	46	0	0	1	22	21	15	0.71	13.33	4	4	46.81	28	33	5
12	2	13	42	30	9	0.30	0	1	2.5	74.94	8	38	7	0	5	47	7	8	1.14	0	1	2.5	62.76	10	27	7
13	1	7	53	15	6	0.40	0	1	2.5	67.24	16	47	1	0	4	37	25	9	0.36	66.67	3.5	3.5	66.44	12	32	4
14	2	18	36	26	8	0.31	25.00	1.5	2.5	66.42	15	46	5	0	7	12	16	22	1.38	54.55	4.5	4.5	34.61	20	36	14
Mean	1.57	8.79	30.93	17.21	5.85	0.41	15.95	1.75	2.54	65.64	9.36	35.43	4.36	2.43	4.21	24.93	19.71	12.29	0.73	32.68	3.38	3.63	51.62	20.00	33.07	5.00
Difference:														0.86	-4.58 ²	-6	2.5	6.44 ¹	0.32 ¹	16.73	1.63 ¹	1.09 ²	-14.02 ²	10.64 ²	-2.36	0.64

Notes: MIA: MI-adherent, MINA: MI-inadherent, OTH: other, QU: question,
 RE: reflection, RE per QU: reflections per question,
 CT: change talk, FW: follow/neutral, ST: sustain talk,
 REL Global: relational global, TECH Global: technical global,
 PvetS: percentage veterinarian speech of total (veterinarian plus farmer) speech,
 %CR: percent complex reflections of total (simple plus complex) reflections

MITI global scores and behaviour counts: overall 'fair competency'	MITI global scores only: 'fair competency'
MITI behaviour counts only: 'fair competency'	¹ Difference significant at $p < 0.05$ ² Difference significant at $p < 0.01$

Appendix 11

Questionnaire feedback from question 1: What did you like about the training?

Theme		Feedback
Delivery	Experiential exercises	<i>'The ability to practice the techniques and get some feedback and analysis on performance'</i> <i>'Interactive nature of the learning, allowing us to use the skills learnt'</i>
	Use of multiple mediums	<i>'Good mix of talking, videos, examples and activities'</i> <i>'Mix of theory and practical'</i>
	Structure	<i>'Good pace'</i> <i>'Not too long'</i> <i>'I liked the structure'</i>
	Trainer	<i>'Excellent delivery, very motivational in itself'</i> <i>'Alison is a very positive and encouraging teacher- the training was very memorable'</i>
	Supporting materials	<i>'Helpful reminder cards to take away and have in the car'</i> <i>'Good course notes'</i>
	Accessibility	<i>'Easy to attend- Alison came to us'</i>
	Simplicity	<i>'It was kept simple'</i>
	Atmosphere	<i>'Relaxed atmosphere- felt 'safe'!</i> <i>'It was relaxed by informative'</i>
	Group based training	<i>'I liked the large group environment'</i> <i>'I liked the discussions within the group we had'</i>
Content	Evidence base	<i>'Useful to hear about the research that has been done'</i> <i>'I liked the science base'</i>
	Novel insights	<i>'Something genuinely different- not come across Motivational Interviewing before- that made a lot of sense'</i> <i>'Fresh approach to challenge traditional thinking'</i>
	Thought provoking/ interesting	<i>'Thought provoking- made me assess my own communication method'</i> <i>'Made me think about how I communicate on a day to day basis'</i> <i>'It was interesting to see how different tones or ways of delivering questions can influence people's answer and outlook'</i>
	Usefulness	<i>'Practical tips that can be used in day-to-day work'</i> <i>'Fantastic ideas on how to get clients to think differently about change'</i>
	Relevance/ applicability	<i>'Very relevant to what we do'</i> <i>'General rather than specific veterinary application'</i>

Appendix 12

Questionnaire feedback from question 2: What did you not like about the training?

Theme		Feedback
Delivery	Experiential exercises	<p><i>'Thinking of things I wanted to change and was willing to discuss!'</i></p> <p><i>'Too much 'pairs' work, role play with someone next to you'</i></p> <p><i>'Too fast and could have done with more time'</i></p>
	Limited time	<p><i>'Would have been good to have a few more sessions over a longer time period'</i></p> <p><i>'In two evening sessions it felt a little rushed. It was a shame we couldn't fit in more time for longer sessions'</i></p>
	Video example	<p><i>'The video with the woman who wanted to quit smoking came across to me as patronising'</i></p> <p><i>'Find it a bit confusing how all the mnemonics fitted together, e.g. Four processes for change, CAPE etc'</i></p>
	Mnemonics	<p><i>'I'm not a big fan of acronyms, DARNCAT, OARS, CAPE etc. One is probably fine, two or more is asking more than my brain can cope with'</i></p>
	Closing the session	<p><i>'Lack of summary/recap at the end and no attempt to put all the skills together (all were taught separately) it would have been nice to have had a practice consult'</i></p>
Content	Similarity of skills	<p><i>'It is all very similar and although important to distinguish different approaches it is difficult to listen to and hold attention'</i></p> <p><i>'Does not account for people who are not talkative'</i></p>
	Need for more training topics	<p><i>'Little in the way of advice/explanation of what to do if Motivational Interviewing is not working'</i></p> <p><i>'Very full schedule with both knowledge exchange and clinical delivery 24/7- need further consideration of these conflicts in approach to engaging with vet practice and farmers'</i></p>
Personal insight	Time of training	<p><i>'Hard to focus after a long day on farm- would be better as an afternoon session'</i></p>

Appendix 13

Questionnaire feedback from question 3: What did you learn?

Theme	Feedback	
<i>MI consistent approaches</i>	Relational awareness	<i>‘That I need to approach interactions with a more compassionate state of mind’ ‘To see things from their point of view’</i>
	Technical awareness	<i>‘Be wary of farmer vocalising and reinforcing the reasons not to/ encourage vocalising reasons to / come to own conclusions/actions’ ‘To encourage the farmer to embrace the changes by getting them to talk themselves into it’</i>
	Importance of listening	<i>‘Listen more, talk less’ ‘Need to listen more, be less presumptuous’ ‘The importance of listening rather than talking all the time’</i>
	Avoiding the righting reflex	<i>‘That we don’t have to force advice on people if they don’t want it- and if they don’t want it, they’re not ready to listen and it’s not worth giving it’ ‘That persuasion with arguments is not a successful way of motivating change’</i>
	The Four Processes	<i>‘How to engage, how to focus, how to evoke and how to get people to plan their activities ahead in terms of what they want to change’</i>
	Evoking confidence	<i>‘The scale of importance to them (1-10)’ (The confidence ruler) ‘How to be more positive with farmers and try and encourage their ideas’</i>
<i>Core MI skills</i>	Skill set	<i>‘A number of techniques to try’ ‘How to influence people’s answers’ ‘A useful structure like of OARS’ (Open questions affirmations, reflections, summaries)</i>
	Open questions	<i>‘Asking open questions and listening can provide lots of information’ ‘Questions can be used to glean more important information from the farmer’</i>
	Affirmations	<i>‘To praise clients more!’ ‘That reflections and affirmations are important’</i>
	Reflections	<i>‘Reflections- always listen and reflect on what they have said’ ‘To use different types of questions and reflections with farmers’</i>
	Summaries	<i>‘Making sure everyone is clear after a talk helps avoid miscommunication’</i>
<i>Wider benefits</i>	Engaging farmers	<i>‘How to engage farmers more effectively and tackle a problem organically from the root of what the FARMER perceives as the problem’ ‘More skills to get farmers engaged’</i>
	Inspiring change	<i>‘Hopefully how to improve client compliance’ ‘That there are different methods of convincing people to do things’ ‘The benefits of a two way conversation’</i>
	Improving relationships	<i>‘How to have a better client-vet relationship’</i>
	Improving communication	<i>‘Awareness of self and others communication styles/techniques’ ‘What I’m doing wrong when talking to clients’ ‘I learnt that communication is an art and can be quite difficult at times’</i>
	Structuring conversations	<i>‘How to structure a conversation to try and elicit change’ ‘How to develop a better, well informed structure for clients and how it is possible to alter this structure depending on the client’</i>
	The existence of MI	<i>‘About the existence of Motivational Interviewing and its place in vet practice’</i>

Appendix 14

Questionnaire feedback from question 4: What communication skills worked on farm?

Theme		Feedback
MI consistent approaches	Technical awareness	<p><i>'Listening for change talk and using that'</i></p> <p><i>'Guiding them to make the suggestions you want to make'</i></p> <p><i>'Drawing out the farmers own reasons for change rather than going straight to my opinion'</i></p>
	Importance of listening	<p><i>'Letting farmers speak for themselves and just listening'</i></p> <p><i>'Listening and allowing them to keep talking gives me more information'</i></p>
	Avoiding the righting reflex	<p><i>'Avoiding righting reflex important!'</i></p> <p><i>'Let them say what they want to say- do not interrupt/enforce your own idea'</i></p>
	The Four Processes	<p><i>'I tried the four main processes of MI (engaging, focusing, evoking, planning). I cannot say they did not work, but I think our conversation was a bit different than it usually would be'</i></p>
	Respecting autonomy	<p><i>'Asking permission to give opinions very effective- soft responses from hard farmers'</i></p> <p><i>'Asking permission to give advice- worked really well'</i></p> <p><i>'Asking them to rank importance on a scale of 1-10'</i></p>
	Evoking confidence	<p><i>(The confidence ruler)</i></p> <p><i>'Encouragement'</i></p> <p><i>'Not talking at the farmer the whole time'</i></p>
	Talking less	<p><i>'Allowing the farmer to actually explain what the whole situation is'</i></p> <p><i>'Putting the ball more in their court-getting them to think rather than telling'</i></p>
	Core MI skills	Open questions
Reflections		<p><i>'Checking back farmer responses very effective, especially at getting to the root of a problem'</i></p> <p><i>'Reflections of their proposed changes'</i></p>
Summaries		<p><i>'Summarising worked with clients'</i></p>

Appendix 15

Questionnaire feedback from question 5: What communication skills did not work on farm?

Theme	Feedback
<i>MI consistent approaches</i>	<p>Four processes</p> <p><i>'Difficult to really separate out the engagement part of the structure. Often clients are already well engaged with the issue if it has got to the point of having a herd health review about it'</i></p>
<i>Core MI skills</i>	<p>Open questions</p> <p><i>'Open questions don't always lead to the answers needed' 'Some of the questioning techniques'</i></p> <p>Affirmations</p> <p><i>'The farmer looked slightly suspicious when I tried to affirm- possibly not subtle enough!'</i></p> <p>Reflections</p> <p><i>'I didn't feel I could reflect as much as I wanted to due to time pressure' 'Repeating client comments sometimes feels stilted and potentially patronising'</i></p> <p>Summaries</p> <p><i>'To me, it is very awkward to apply reflection and summaries of the points that farmers bring out, as to me it just feels weird to repeat things the farmers said, although it might have an impact in longer term'</i></p>
<i>Wider challenges</i>	<p>Changing personal style</p> <p><i>'Hard to change communication structure when farmers already know you' 'One farmer did seem unsettled with my change in technique so I had to revert back to my normal style'</i></p> <p>Unpracticed skills</p> <p><i>'The technique is a bit clunky to start with and requires practice as it is a very different way of communicating. to start with it can make you appear quite hesitant' 'I think they all work eventually but getting comfortable with the techniques is difficult but when I mastered it they responded better'</i></p> <p>Concern on genuineness</p> <p><i>'Need to be careful with this approach not to look contrived'</i></p> <p>Conscious adoption</p> <p><i>'Having time to think more carefully about a conversation to use these techniques rather than 'just doing what you usually do''</i></p> <p>Wider application</p> <p><i>'Wasn't sure how to/what elements of MI to include in conversations not talking about change'</i></p> <p>Finding 'space' for MI</p> <p><i>'I can't always get them to stop talking!' 'Sometimes difficult to stop them talking/direct to something useful'</i></p> <p>Acually, all worked!</p> <p><i>'All good-so far!' 'All worked for different farmers' 'So far all worked well'</i></p>

Appendix 16

Questionnaire feedback from question 6: What amount (if any) of your CPD budget would you be willing to pay to take this training?

Price		Feedback
<i>Tick boxes provided</i>	£0 (I would attend if free)	<i>4</i>
	£25	<i>3</i>
	£50	<i>6</i>
	£100	<i>16</i>
	£150	<i>3</i>
	£250+	<i>1</i>
<i>Average price willing to be paid</i>		£81.00

Appendix 17

Questionnaire feedback from question 7: Would you recommend this training to a colleague- and why?

	Theme	Number	Feedback	
Yes	No additional comment	18	n/a	
	Interesting	3	<i>'Yes, because it is interesting and very important for us to communicate well and efficiently'</i>	
	Important	2	<i>'Yes, a very important day to day skill'</i>	
	Useful			<i>'Yes, very useful and makes you rethink how to approach clients'</i>
			2	<i>'Yes, communication skills are a (unclear word) to our work and motivational interviewing training should prove very useful'</i>
	Helpful	1	<i>'Yes, I found it both interesting and potentially helpful'</i>	
	Applicable	1	<i>'Yes- interesting and can be applied in lots of situations'</i>	
	Enhances communication			<i>'Yes I would recommend this, because it really opens one's mind, that there are different aspects to communication and there is a lot one can do to become better at it by applying different approached and rules'</i>
			3	<i>'Yes I'd recommend it- good to think beyond one's usual communication skills'</i>
	Helps with motivating change			<i>'Yes. I think as vets we often give advice but fail to motivate change. These skills should help, with better outcomes for us, farmers and cows!'</i>
		3	<i>'Yes. Motivating change is critical to farm practice and improving animal health and welfare. This seems to be the most proven way of achieving this at the moment'</i>	
More effective advice			<i>'I would recommend because the more we think about how we approach advising farmers, the btter we are likely to get at it'</i>	
		1	<i>'Yes. Sheds a different light on conversations with clients- makes you think about how you can help them- makes you listen, and the way you word a question can have a big effect!'</i>	
		(Total 34)		
Depnds	On current skill	1	<i>'Depends if they were/weren't good at communicating'</i>	
Probably not	Online options	1	<i>'The sort of thing that might be available online, so probably not'</i>	

Appendix 18

Brief supplementary study on ‘acceptable influence’ in daily practice for veterinarians and motivational interviewing professionals

Veterinary professionals attending the Animal Welfare Science Ethics and Law Veterinary Association 2015 conference (n=39) who received a presentation on MI and the veterinary context along with MI professionals (n=24) attending the Berlin MI Network of Trainers (MINT) Training of New Trainers 2015 were provided with a questionnaire concerning ethical influence of clients taken from Yeates and Main (2010; Appendix 19). Participants were asked to state whether a variety of forms of influence - such as moral priming, guilt tripping or encouraging certain options - were ‘ever acceptable’ in veterinary practice. Participants could indicate yes, no or undecided in their answer.

Overall, veterinary professionals agreed (>50% respondents saying yes) that more forms of influence were acceptable than did MI professionals (vets n=16, MINT n=9), and disagreed (>50% respondents saying no) with fewer forms of influence than did MI professionals (vets n=3, MINT n=5). There was only one area of influence that MI professionals agreed to (>50% saying yes) that veterinary professionals did not, which was manipulating the accuracy of information. Details are provided below.



Yes: agreement	<ul style="list-style-type: none">• Encouraging options, engaging in reasoning, developing owner capabilities, availability of information, history/educating, memory/reminders, interpreting evidence, presentation of information
Yes: only veterinary professionals	<ul style="list-style-type: none">• Moral priming, using the human-animal relationship, societal influence, value loading, emotional priming, personal suggestions, external barriers, prominence of facts
Yes: only MI professionals	<ul style="list-style-type: none">• Accuracy of information
No: agreement	<ul style="list-style-type: none">• Pressurising, coercion, guilt tripping
No: only MI professionals	<ul style="list-style-type: none">• Peer pressure, forcing options

Figure: Areas of influence that veterinary and MI professionals agreed and disagreed on via questionnaires on the ethics of influencing clients

Where yes or no to an area of influence was categorised as >50% questionnaire respondents indicating the same answer

Appendix 19

Questionnaire used for brief supplementary study on ‘acceptable influence’ in daily practice for veterinarians and motivational interviewing professionals

Do you believe these forms of influence would ever be acceptable when using Motivational Interviewing in veterinary practice?
Please tick as appropriate

Form of influence	Example	Ever acceptable?		
		Yes	No	Undecided
Availability of information	<i>Restricting/providing information that would alter a client's decision</i>			
Accuracy of information	<i>Honesty or lying</i>			
Prominence	<i>Emphasising or down-playing facts</i>			
History and education	<i>Educating e.g. about a disease or an animal's needs</i>			
Memory	<i>Reminders to increase compliance</i>			
Directly interpreting evidence	<i>Leading statements e.g. 'that animal is suffering'</i>			
Presentation of information	<i>Stressing chance of survival versus death</i>			
Moral priming	<i>Saying an owner has an obligation to animal welfare</i>			
Human-animal relationship	<i>'Pulling at heart strings'</i>			
Societal influence	<i>Highlighting behaviour of comparable owners</i>			
Value-loading information	<i>Using terms such as 'severe', 'pain', 'kill'</i>			
Emotional priming	<i>Repetition of certain statements, an optimistic or resigned tone</i>			
Guilt tripping	<i>Saying one option would be cruel</i>			
Pressurising decision	<i>Rushing the owner</i>			
Engaging in reasoning	<i>Joint decision making</i>			
Personal suggestions	<i>Saying 'I would do'...</i>			
Encouraging certain options	<i>Leading the client through a thought process</i>			
Peer pressure	<i>Offering a 2nd opinion (that agrees with you)</i>			
Coercion	<i>Threatening to terminate care</i>			
Forcing options	<i>Prosecuting</i>			
Owner-based barriers/capacities	<i>Developing the client's abilities, resolving barriers such as cost</i>			
External barriers/opportunities	<i>Offering or refusing to provide an option</i>			

Table from:
Yeates JW & Main DCJ 2010. *The Ethics of Influencing Clients*. JAVMA 237 (3): 263-267.

Appendix 20

Ethical considerations for use of MI as conveyed by Miller and Rollnick (2012):

1. *The use of MI component processes is inappropriate when available scientific evidence indicates that doing so would be ineffective or harmful for the client*
2. *When you sense ethical discomfort or notice discord in your working relationship, clarify the person's aspirations and your own.*
3. *When your opinion as to what is in the person's best interest differs from what the person wants, reconsider and negotiate your agenda, making clear your own concerns and aspirations for the person.*
4. *The greater your personal investment in a particular client outcome, the more inappropriate it is to practice strategic evoking. It is clearly inappropriate when your personal investment may be dissonant with the client's best interests.*
5. *When coercive power is combined with a personal investment in the person's behaviour and outcomes, the use of strategic evoking is inappropriate.*