

The Development of a Human Behaviour Change (HBC) Intervention to Increase the Adoption of Body Condition Scoring Cattle by Hand: *What are the Barriers & Drivers of Change?*

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Introduction

Excessive leanness or obesity in pregnant animals can have undesirable health and welfare outcomes both for the dam and for developing fetal progeny. In cattle, extreme leanness contributes to calving difficulty, poor calf development and subsequent failure of the mother to conceive again.^{1,2} Obesity also represents an inefficient use of feed resources with financial costs to the farm business and an associated environmental cost. Adjusting food quantity and quality to maintain body fat within an acceptable range is therefore expected to deliver multiple benefits. Despite this, a recent study of commercial beef farms in the UK found that 20% of pregnant cows were too lean prior to spring calving.³ The recommended approach for monitoring fat deposits in a practical context is body condition scoring (BCS), which requires use of the hand to provide a subjective judgement of subcutaneous fat depth at key points on the body. Animals are then assigned a value on a categorical scale. BCS can be conducted quickly when performed alongside other routine animal handling tasks. Despite the apparent ease of BCS and the benefits of maintaining body condition within an acceptable range, only 4% of UK beef farmers use the recommended approach of using their hands.⁴ Our own research also reveals that most farmers tend to judge body condition from a distance by eye without using the hands. In the UK, the recommended hands-on approach to body condition scoring and the associated scoring scale have been advocated for over 50 years. The low uptake contrasted against the expected benefits of optimum body condition management suggest an ingrained reluctance to adopt the approach. This study aims to understand the barriers responsible for this poor uptake.

The Behaviour Change Wheel

There have been several studies that have examined the influences on farmers'/stockpersons' behaviours and cognitions in relation to animal health & welfare⁵. However, a significant proportion of these studies refer to individualistic theories to explain behaviour(s) thus often falling short of accounting for the complex interplay between the individual and the social, economic, historical, and cultural factors. Given what we know about the complex nature of farming and animal welfare-related issues, it is important that we fully understand the influences on a desired behaviour such as BCS by hand. One theoretical model that considers the complex and synergistic nature of human behaviour is the Behaviour Change Wheel (BCW).⁶ Drawing from the BCW we therefore aim to identify the likely barriers and drivers of BCS by hand to develop a potential intervention to increase the adoption of BCS in the future.

Methods

Participants & Ethical Approval

- The data was collected from six focus groups. All focus groups took place during a knowledge exchange event or farming/farmers meeting. Open-ended survey data was also collected from 25 farmers/stockpersons.
- Ethical approval was granted from SRUC Social Science Ethics Committee, Protocol # 73026312.

Materials & Procedure

- A semi-structured interview schedule was used to facilitate the discussions in the focus groups.
- The focus groups were moderated by one of the animal welfare researchers (ST). The focus groups were recorded using a high-resolution WAVE/MP3 recorder. Each focus group lasted between 25 & 40 minutes. The focus groups were then transcribed and validated. The data then went through a systematic coding & analysis process to identify and develop a potential human behaviour change intervention; guided by the steps outlined in the BCW and outlined in the following section.

HBC Mapping & Intervention Design: Data Analysis

Stage 1. Coding of the Farmers' Shared Beliefs using Content Analysis

- The transcripts were content analysed by one of the researchers (LJ) & later reviewed by another researcher (ST). The first stage in our content analysis approach was guided by our research questions: 1. What are the barriers and drivers of body condition scoring by hand? and 2. What are farmer's perceptions and beliefs around the conditioning of their cows?

Stage 2. Mapping Farmers' Beliefs onto the TDF Domains & Constructs

- In stage 2, three psychologists acted as reviewers & read through the list of barriers and drivers identified. The reviewers then mapped the farmers' shared beliefs or themes on to the domains and constructs identified in the Theoretical Domains Framework (TDF)⁷ of the BCW.⁶

Stage 3. Linking the TDF domains and COM-B components on to the BCW Intervention Functions.

- In stage 3, one of the researchers (LJ) mapped the agreed TDF domains from stage 2 on to their respective COM-B components to provide a "behavioural diagnosis" i.e., in terms of what needs to change to achieve our desired/target behaviour (i.e. adoption of BCS by hand). Following the relevant BCW steps, we then linked the behavioural diagnosis with the relevant intervention functions.

Stage 4. Linking BCW intervention functions to policy categories & applying APEASE criteria to both

- In stage 4 of our intervention design, we mapped the intervention functions on to their specific policy categories as guided by the BCW. Each of the policy categories have been identified as best supporting the delivery of the respective intervention functions. The BCW policy categories, which form the outer circle of the BCW (see Figure 1 below), represent the types of decisions that governments or organisations might make to fund, support, and enact an intervention. The APEASE criteria were then applied to the interventions and policy categories.

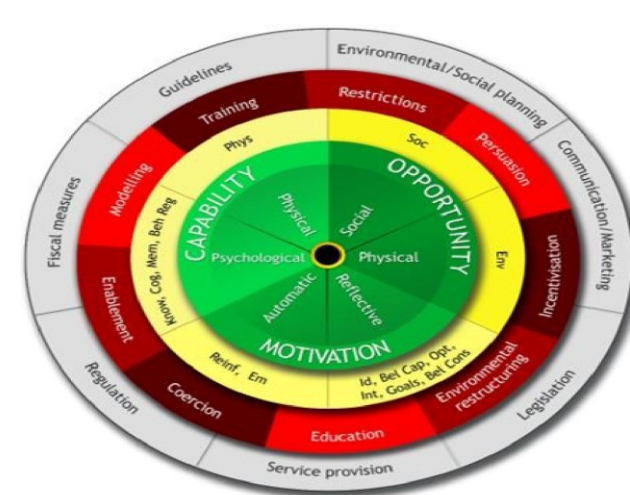


Figure 1. The Behaviour Change Wheel⁶

The wheel illustrates the COM-B model (green), TDF framework (yellow), Intervention functions (red) & Policy Categories (grey)

Stage 5. Linking the intervention functions and TDF domains to the Behaviour Change Techniques (BCTs)

- Using the BCW, the BCT Taxonomy online resource⁸ and the BCTTv1 Smartphone App⁹, potential BCTs for each of our TDF domains and intervention functions, which met the APEASE criteria in stage 3, were identified.



Image: Professor Simon Turner demonstrating BCS by hand

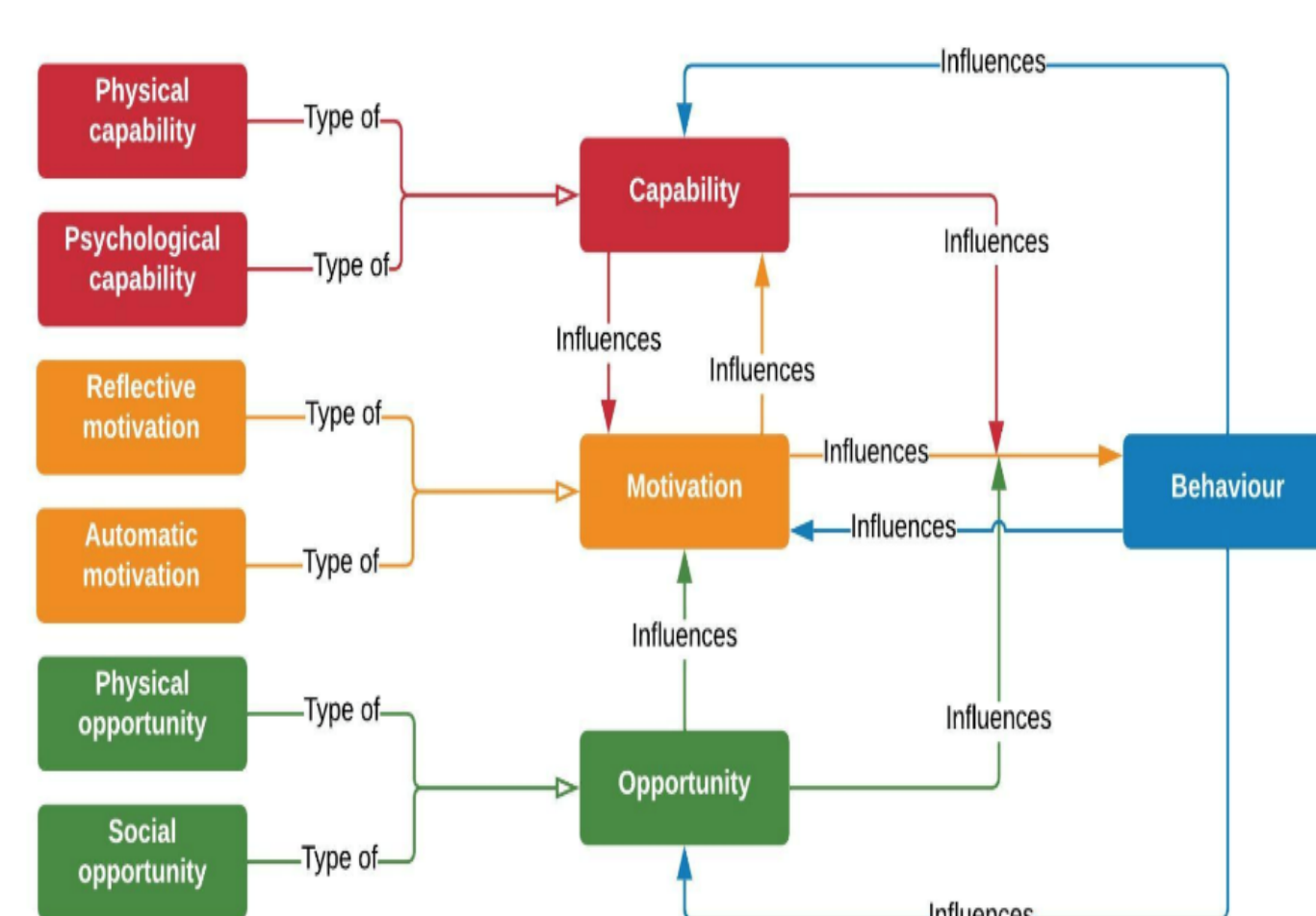


Figure 2. COM-B Model of Behaviour¹⁰
The figure illustrates the synergistic nature of behaviour e.g., if there is opportunity &/or capability but a lack of motivation or vice versa, the behaviour will not occur.

Results

HBC Mapping: Stage 2 analysis

- An overall moderate agreement between the reviewers in their mapping of beliefs to the TDF domains was found Fleiss's kappa=0.455 (95% CI, 0.305 to 0.605), $p < 0.001$.
- Individual Kappa revealed good agreement for **Environmental Context and Resources**, $K=0.717$ (95% CI, 0.415 to 1.02) $p < 0.001$, and **Beliefs in Consequences**, $K=0.692$ (95% CI, 0.252 to 0.857) $p < 0.001$.

The Behavioural Diagnosis

APEASE

- The intervention functions that were found to be potentially feasible after applying the APEASE criteria were **Education, Enablement, Training, Modelling & Persuasion**.



- The policy categories found to be potentially feasible after applying the APEASE criteria were **Communication/Marketing, Guidelines, & Service Provision**.

Conclusions

- Drawing on the BCTs that we identified from our intervention design stages 1-5, we were able to design a potential intervention, which we plan to implement & assess.
- The BCTs we will include in our intervention are : 1. Information about social & environmental consequences ; 2. Information about health (animal) consequences; 3. Feedback on behaviour or on outcome(s) of the behaviour; 4. Self-monitoring of behaviour or outcomes of behaviour & 5. demonstration of behaviour from a credible source.
- We will be running workshops that are directly informed by our intervention design e.g., BCS demonstrations from the animal welfare researchers & other farmers who know how to BCS by hand (our credible sources).
- We will create guidelines that are directly informed by our BCW diagnosis /intervention design.
- The phase of change of the farmer/stockperson – another important factor in any HBC design – will also be considered.

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