

Methodology for studying human attitudes and behaviour to cow–calf contact systems

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Research Reflection

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Abstract

This position paper describes a common stand on methodology of human attitudes and behaviour that is suitable to use in studies regarding cow–calf contact (CCC) in dairy production, in order to create a common knowledge base and foundation for future recommendations of CCC systems. We describe how different quantitative and qualitative methods can be used to study human attitudes to CCC as well as farmer or consumer behaviour. We aim to contribute to a better understanding of the available methods, and hope that this paper can be used as a guideline for future studies in this area.

Animal welfare concerns are growing worldwide, and consumers place steadily higher demands on the products they consume. Branding is becoming increasingly important in marketing and the concern with how cow and calf are kept in early lactation and early life is growing (Busch *et al.*, 2017). Concurrently, the interest and use of cow–calf contact (CCC) systems is increasing among scientists, producers and consumers (Brombin *et al.*, 2019).

Implementation of a CCC system requires changes in daily practices and long-term priorities, compared to systems where calves and cows are kept separately (i.e. artificial rearing). Farmers need to observe, act and interact differently when calves live among the dairy cows, compared to being in calf pens. In order to evaluate and estimate the viability and acceptance of the CCC systems, and the products of such systems, we need to investigate the attitudes and perceptions among farmers, consumers and other stakeholders.

To study and develop these questions and to explore the benefits of collaboration, we formed a consortium of European researchers in CCC systems in order to bring this area of research forward in a constructive and structured way that will enable future meta-studies. Thus, this position paper compiles this collective knowledge and aims to propose a common stand on methodology that is suitable to use in studies of human attitudes and consumer behaviour regarding CCC in dairy production, in order to create a common knowledge base.

The terminology of the theme of CCC has been outlined in Sirovnik *et al.* (2020) and the methodology for the animal side of experimental and observational studies has been described in de Oliveira *et al.* (2020), while we here wish to make further recommendations regarding methodology for studies of the human attitudes and behaviour in response to CCC. In this paper, we describe and recommend methods from social sciences and psychology that can be applied to study CCC systems in order to advance our understanding of consumers and societal views as well as farmer's attitudes and their relationship to their animals.

Exploring experience, attitudes and perceptions in relation to CCC

CCC systems and the issues of early separation of cows and calves contain conflicting interests and perceptions, and a transition to this system requires changes in human and social perceptions and actions at farm level, and beyond. Therefore, the visions and drivers, social structures and experiences related to these systems are important research issues and it is necessary to undertake social and human scientific research to find ways of developing future dairy systems.

Questionnaires

Questionnaires with closed questions allow us to gather quantitative data on a variety of aspects including attitudes of different stakeholders to CCC systems as well as farmers' husbandry practices. For example, questionnaires can be a valuable tool to give insight into aspects of the farmer–animal

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relationship, and the attitudes involved (Hemsworth and Coleman, 2011; Ebinghaus *et al.*, 2018). Questionnaires can be part of observational on farm studies (e.g. Waiblinger *et al.*, 2002) or constitute independent surveys performed on-line, by postal sending or other formats of distribution such as milk control bodies. Independent surveys offer the possibility to include a large number of participants, potentially in different countries (e.g. Busch *et al.*, 2017). Further, existing quantitative questionnaires can be used by different researchers without extensive training, allowing for high comparability of data. However, translation to another language requires care to avoid changed meanings, and standard procedures therefore include back-translation (see Busch *et al.*, 2017). Development of quantitative questionnaires requires an in-depth knowledge of the topic to be explored, both when investigating attitudes or husbandry practices, as the questions and response options might otherwise not reflect the whole range of possible characteristics. Qualitative research methods are thus sometimes used as a basis for questionnaire development. To add to the quantitative data collection, it is also possible to include open-ended questions in the questionnaires, giving the respondents opportunity to explain in their own words what they experience.

Individual interviews with open-ended questions

Semi-structured, qualitative research interview methodologies explore a spectrum of attitudes and experiences within a certain field, and they allow the interviewer to follow the story line and argumentation of the interviewee. Where closed questions do not fully exploit the internal logic of each interviewee, qualitative interviews are ideal for exploring areas where the interviewee can refer to their own range of attitudes, perceptions, experiences, choices and development histories. It can be useful to combine the semi-structured qualitative interviews with closed questions, which allow a relatively uniform presentation of the subject material (e.g. different herds) and thereby the context. In relation to CCC systems, semi-structured qualitative interviews are suitable for describing farmers' and other subject's experience with these systems, as well as choices related to and contexts around the development of these systems. They are also suitable for exploring experience and attitudes related to animal welfare as understood in farmers' perceptions, e.g. in the study of Vaarst and Sørensen (2009), where Danish farmers' experience, practices and strategies related to calf care and mortality were explored. Another example of this is the study by Ellingsen *et al.* (2012), which explored the attitudes and experiences of calf health and welfare in Norwegian organic farms among veterinary practitioners and agricultural advisors. However, individual qualitative interviews are less suitable for exploring specific attitudes towards issues, such as CCC systems, among farmers and actors who have no prior experience in the field. Topics that are abstract to the interviewees are better explored through focus group interviews (described below), where they can bring the topic into play using various experiences around CCC systems. The value in individual qualitative interviews lies in the perspectives and experiences of each participant, and it is not suitable for presenting a representative sample of opinions or for quantifying opinions or experience among a group of people (Strauss and Corbin, 1990; Brinkmann and Kvale, 2015). The interviewer has an important role in following up and explore apparently self-contradictory statements, asking for further examples, and taking responsibility for keeping to the themes of the interview. The themes consequently will have different weight and focus in different interviews and it is important to take context into account.

Qualitative interviews can be analysed using different methods, from in-depth case studies using narrative analyses, exploring the development in one or a few farms and using the story and plots as central elements. Many qualitative interview studies in the human and veterinary health and agriculture sectors use various versions of Grounded Theory Analysis, including typically 15–25 interviews of people within the same profession. Despite being from the same profession, there will be a range of experiences and backgrounds among the participants. However, an interview study can also include several different actor groups (Rell *et al.*, 2020).

Using Grounded Theory, the whole interviews are transcribed and organized into small statements (meaning condensates), which are organized into themes and form a so-called paradigmatic model. The choice of theoretical framework, such as phenomenological (very shortly and simply understood as exploring a phenomenon as it exists in our conscious experience, or as a reflective study of the essence of our consciousness) or hermeneutic (shortly and simply defined as analysis of our experience in the context and surrounding values), will lead to choices of interview analysis methods, hence also shape each interview study, as well as the type and focus of the themes and questions.

Exploration with focus group interviews

Focus group interviews or discussions is an interactive method, where a group of participants are asked to voice their opinion on and discuss a certain matter. This is a well-established qualitative data collection method, which encourages communication and group interactions, and thereby exploration of abstract fields. This can give new and different angles to issues, compared to for example individual interview methods. In CCC research, focus groups could be useful for example for following the discussions of consumers and stakeholders in order to evaluate the relevance of different types of systems (for example, foster cow vs. dam rearing or cow-driven vs. calf driven; Sirovnik *et al.* 2020). Focus group interviews are also useful as a first exploration of a field, providing a basis for specific questions for a questionnaire or relevant research questions for further studies, which is very suitable for CCC applications. The method should normally be practiced in small groups of selected participants under the guidance of a moderator or facilitator. The duration is rather short, usually 60–90 min, and different material (photos, videos, cards with statements and many other options) can be used. The group discussions are normally audio or video taped, to be transcribed and analysed (Barbour, 2007; Wibeck *et al.*, 2007), but other products can also be used (written material, drawings or storyboards, for example). Focus group interviews examine discourses, conflicts, concepts, abstract ideas, future development options and are useful to understand how knowledge develops and operates within a given cultural context. The focus group interview will typically negotiate opinions, future visions on development or other more abstract issues. This method benefits from the dynamics in a group, where every participant contributes to challenge the topic and the other participants, in order to seek common understanding without exposing themselves beyond what they would feel comfortable with within a group of fellows.

Exploring the daily life and choices in CCC systems

Questionnaires and qualitative individual or focus group interviews can provide valuable insight into the experiences, attitudes and perceptions among farmers, consumers and stakeholders.

They can also, to some extent, give insight into farm practices and the relationship between humans and animals. However, in order to get in-depth knowledge about the system and its consequences on farm level, we need to study the system more closely.

Exploring and assessing the human's relationship to the animals

The farmers' and stockpersons' relationship towards their animals are of utmost importance for farm animals' welfare (for review see Waiblinger, 2019) and may thus be an important factor for success or failure of a CCC system. Attitudes are an integral part of humans' relationships to their animals; they are strongly linked to the way in which animals, and interactions with them, are perceived and how humans actually behave towards animals (Hemsworth and Coleman, 2011; Waiblinger, 2019). By evaluating attitudes and observing behaviour of stockpersons we can get insight into their relationships with the animals. To get a complete picture both should be evaluated as well as the animal side of the relationship (see de Oliveira *et al.*, 2020).

An attitude questionnaire was developed and validated for dairy stockpersons (Waiblinger *et al.*, 2002) and, partly modified, used successfully in further studies in several European countries. It was applied on farms differing in size, housing systems and structure (Ebinghaus *et al.*, 2018, Andreasen *et al.*, 2019). The use of a validated questionnaire and correspondent analysis allows for comparison between studies, facilitating meta-analyses.

The stockpersons' behaviour towards their animals can be observed directly during daily routine interactions. In dairy cows, daily milking or moving to milking offers suitable opportunities for these observations (e.g. Waiblinger *et al.*, 2002). In farms with automatic milking systems, daily control and moving of cows with incomplete milkings can be used. Creating special situations, such as asking the farmer to catch one or several animals may show human behaviour that is not as authentic as in day-to-day activity. Nevertheless, this can yield valuable information (Ellingsen *et al.*, 2014). In most studies farmers were debriefed on the real purpose of the study only after observing them, however, this has been criticized to contradict participatory approaches. If observation of stockperson behaviour is too time consuming or not feasible for other reasons, attitude questionnaires and questionnaires on contact behaviour can give some insight as well (Ebinghaus *et al.*, 2018).

Getting close with participant observation

The anthropological research approach 'participant observation' is relatively rarely applied in studies of farmers and their choices but could very well be used in studies of CCC systems. In this method, the researcher participates actively among the study subjects while also observing them during an extended period of time, ranging from days until years. Participant observation includes studying the daily practice life and has the potential to explore how perceptions, visions, values and practices are mutually connected and co-develop, and results in in-depth knowledge about the system that is studied. The insight by using this method could be valuable for further development of CCC systems and for addressing current debates on the topic. The method is particularly relevant and mostly used to explore the multiple and complex perspectives of social structures and cultures of societies or professional environments, where various controversial issues are often in focus. This method requires time and resources far

beyond an interview study, but can potentially bring valuable insights on discourses, developments and dynamics. For example, Overstreet (2018) described discourses connected to, as well as human, social and societal consequences of the increasing production focus and disassembly of cow- and human bodies in commercial dairy farms. They showed how biotechnological interventions pushed an 'animal-machine-development' on the one hand, but also gave room and even required certain 'care practices' on the other. CCC in dairy herds breaks with many current beliefs and practices in industrial farming and will bring both new and old paradigms, practices and perceptions, and not least the conflicts and interactions between them, into focus.

Exploring the market for CCC products

Although CCC may have many beneficial medium- and long-term effects on cow and calf (Johnsen *et al.*, 2016) and may pay off under certain conditions (Asheim *et al.*, 2016), it is currently expected to represent a negative economic value for dairy enterprises. Food product quality is perceived by consumers through search (perceived before purchase, such as appearance), experience (experienced after purchase, e.g. taste) and credence attributes (un-experienced, process characteristics for example) (Caswell and Mojdzuska, 1996). CCC is obviously a credence characteristic which, as with other animal welfare related aspects, may have an appeal for an increasing number of consumers belonging to specific market segments (Carlucci *et al.*, 2009), including those who are considering avoiding consumption of dairy products due to animal welfare concerns. Therefore, studies are needed to assess the effect of information and the consumer willingness to buy, and to pay more, to cover the loss of saleable milk in CCC systems. In the next section, methods suitable for the assessment of consumer willingness to pay a higher price for products obtained from farms with CCC are described.

Assessing product potential with preliminary empirical studies

The first step to be taken when assessing the potential of a new characteristic such as CCC for a product is to use differentiation purposes, which is a preliminary study that identifies the factors influencing consumer choice. In other words, researchers should verify whether the novel characteristic to be tested is perceived as relevant for consumers. These exploratory studies are generally conducted through focus groups with participants responsible for food purchasing (Monika *et al.*, 2004). The attributes elicited by the focus groups, including CCC, can be scored by a representative group of consumers, selected through a stratified sampling technique (Trost, 1986) in order to rate their beliefs concerning the aspects affecting purchase decision and consumption of dairy products. The attributes can be scored on a Likert scale from 1 (unimportant) to 7 (very important) with a central point (4) corresponding to 'neither important nor unimportant' (Braghieri *et al.*, 2016). If the attribute of interest falls within those relevant to the consumers, further studies concerning the value given by consumers to that attribute can be carried out.

Hedonic measures and intent to pay for CCC products

In hedonic measurements, the liking for specific products is measured, and it is a valuable method to investigate global perception of animal-based products (e.g. Napolitano *et al.* 2007). These studies have shown that information concerning various aspects

of animal welfare were able to generate consumer expectations. This information induced either a negative confirmation, when the product without external information was perceived as worse than expected (when the information on animal welfare was positive) or a positive confirmation, when the product without external information was perceived as better than expected (when the information on animal welfare was negative). In both cases, the information was able to shift consumer actual liking in the direction of the expectations (Cardello and Sawyer, 1992). This is something that should be verified in the case of products obtained from CCC systems.

Consumer intent to pay can also be measured through questionnaires. These studies suggested that consumers were willing to pay more for several high welfare animal-based products (Dransfield *et al.*, 2005). However, it has been demonstrated that social desirability induces consumers to bias their responses when asked about socially sensitive topics (such as animal welfare), thus overestimating their real intent to pay (Fisher, 1993), whereas indirect questioning may give a more accurate estimation of consumer perceptions since they now don't have to conform to social norms (Olynk *et al.*, 2010). The type of animal product can affect this social desirability bias (milk *vs.* meat, for example: Olynk *et al.*, 2010).

Thus, both hedonic measures and intent to pay, although suitable for products obtained in CCC systems, may be not indicative of the actual purchase behaviour. In particular, Verbeke *et al.* (2010) defined the duality between citizens and consumers with the former often giving high relevance to animal welfare issues and the latter not buying animal welfare friendly products under economic constraints.

Assessing preferences using contingent valuation

Contingent valuation is a survey-based method, which can be conducted through face-to-face interviews, telephone interviews and web questionnaires. The contingent valuation method allows one to elicit preferences for the evaluation of hypothetical foods and assess whether consumers would pay more for specific changes in the quality of a particular food (Carson *et al.*, 2001). A pitfall of the contingent valuation method is that consumers may be not aware of or simply ignore their budget constraints (Hailu *et al.*, 2000). The construction of an itemized budget where consumers are asked to declare their weekly expenses for a pre-determined set of food items can help to counteract this (Nocella *et al.*, 2010). The consumers are then asked whether they would be willing to pay a certain premium of (30%, say) considering that the total of their previously declared expenses would rise to a new total, which is openly shown to the consumers.

Comparing systems using conjoint analysis

In conjoint analysis, several attributes characterizing a hypothetical product are identified, including price. Different levels are established for each attribute, such as foster cow system and dam-calf system or whole day and part time CCC. Consumers are then asked to rate different versions of this hypothetical product according to the combinations that better suit their preferences (Hobbs, 1996). We recommend this as a suitable method for surveying the consumers' opinion to different CCC systems compared to each other. The method should, however, not be used for marketing studies as it is concerned about the behaviour

of numbers rather than about the behaviour of consumers (Louviere *et al.*, 2010).

Measuring trade-offs with choice experiments

Choice experiments have been widely used to assess the effect of claims concerning animal welfare on consumer preference and willingness to pay (Olynk *et al.*, 2010). These studies envisage the scrutiny of trade-offs based on the assessment of multiple attributes, at two or more fixed levels, characterizing a food product. In other words, consumers are asked to express their choice over different hypothetical alternatives (Lusk, 2003). The reasoning behind this type of study is that the total value of a product derives from the sum of each feature belonging to that product (Lancaster, 1966). Therefore, consumer preferences can be assessed by quantitatively measuring the trade-off between one attribute, such as CCC, against another. If the marginal willingness to pay must be estimated, the trade-off to be used should include money. These studies are useful for products that are not yet available in the market or under development, as in the case of food products obtained from farms with CCC. However, in these experiments, consumers tend to express a willingness to pay higher than their real intent to pay under normal circumstances (hypothetical bias; Lusk, 2003). In order to tackle this issue this potential bias should be openly declared to the consumers before testing. They are then asked to express their willingness to pay while keeping in mind that the allocation of money for that specific product will reduce the amount of money available for other purchases (Olynk *et al.*, 2010).

Using experimental auctions

One way to put consumers close to real life situations is the application of experimental auctions where they can express their actual willingness to pay (Vickrey, 1961) by exposing them to a situation where a potential purchase may occur (Lange *et al.*, 2002). Second-price auctions have been used to assess the value consumers give to various aspects of animal welfare (reviewed by Napolitano *et al.* 2010) and is suitable for products obtained from CCC systems. This specific auction envisages that individual consumers offer a sealed bid where they indicate the highest price they would pay for the product on offer. The winner will be the consumer offering the highest bid. However, they will not pay the amount they offered, but the amount corresponding to the second highest price. In this way the winner will be rewarded by getting the product at a price lower than the value they allocate to it. As the auction procedure may be misunderstood, participants should undergo a thorough training programme and bids should be compared with what the participants self-report as perceived market price to ensure that participants understood the procedure (Corrigan and Rousu, 2008).

The Becker-DeGroot-Marschak method has been suggested as suitable mechanism to assess consumer willingness to pay for animal welfare related aspects (Ortega and Wolf, 2018). This method is designed as a lottery where a consumer places a bid which is compared to a price randomly generated from market prices known to the consumer. If the bid is equal or higher than the market price, then the consumer will pay that price and will receive the food item, whereas if the bid is lower the transaction will not occur. The advantages of this approach include simplicity (no need to recruit groups of consumers as they can be interviewed individually) and appropriate

environment (the auction is conducted in a real setting such as a supermarket). There is, however, a risk of lack of incentive compatibility, arising from that the consumers rely on the market price distribution to express bids (Horowitz, 2006).

Studying actual purchase behaviour

A few studies have explored the effect of credence attributes of products on purchase behaviour in real settings. In a study conducted on a fine restaurant, the pricing and level of information provided about specific issues (such as veal from organic farms, happy calves) for one specific dish had very limited effect on consumer choice (Schjøll and Alfnes, 2017). In a similar study, eggs in a grocery store were clearly labelled with 'cage eggs' on the carton (Schjøll *et al.*, 2013). This caused a sharp drop of the sale of cage eggs. Later, organic eggs were promoted using a poster explaining that the organic hens had more indoor space and outdoor access. The 'positive labelling', however, had no effect on purchase of organic eggs. These results show that negative labelling may have a larger impact on actual purchase behaviour than positive labelling. This is a factor that may not be reflected by hedonic measurements and questionnaires, making studies of actual purchase behaviour an important tool for studying the willingness to pay for animal welfare attributes.

Market segmentation

Animal welfare issues such as CCC are not equally relevant to all consumers. Whatever the method of assessing willingness to pay a premium, market segmentation should always be identified. Based on choice experiments, it has been shown that younger consumers have a larger interest in the process characteristics of the product, such as animal welfare, and this is allied to cross-cultural differences. In a direct comparison, German consumers were generally more interested in animal welfare issues, whereas animal welfare conscious consumers from Poland had a higher educational level (Grunert *et al.*, 2018). In another study based on conjoint analysis the segment of consumers willing to pay more for organic and free-range egg production was characterized by medium-high incomes (Mesias *et al.*, 2011). By combining second price auctions and internal preference mapping it was observed that consumers were generally affected by the information about animal welfare, with higher willingness to pay for higher animal welfare products (Carlucci *et al.*, 2009). However, most animal welfare conscious consumers were able to assimilate their willingness to pay even when a disliked product was offered. Consumers with high income and frequency of consumption were affected by expectancy only when the information about animal welfare was paired with a good eating quality product.

Suitability of the described methods

For studying the human–animal relationship, we recommend direct observations of the stock persons' behaviour towards the animals. Attitude questionnaires and questionnaires on contact behaviour can also give insight into the human–animal relationship.

For farmers, stockpersons and other actors with experience in CCC systems, we recommend individual semi-structured qualitative interview studies to explore the range, type and nature of experiences and choices. For stakeholders, citizens and consumers we recommend focus group interviews, which could also be used

for farmers when exploring visions and views on more general issues. To evaluate the tensions, arguments and change processes related to CCC system transitions, we recommend participant observation and case studies over longer time.

We suggest testing the relevance of CCC through focus groups and consumer studies to verify whether CCC can affect purchase decision and consumption of dairy products. If we assume that CCC will be identified as a relevant aspect for certain segments of consumers an appropriate method to assess their willingness to pay a premium should be applied (for example, experimental auctions and purchase behaviour). Finally, if the identified increased price is deemed sufficient to cover the loss of saleable milk of CCC, this information should be conveyed to the consumers through appropriate communication campaigns.

Conclusions

We have described information and guidelines on methodologies that should be applied in studies of human attitudes in relation to CCC systems. Standardization of these studies will facilitate future meta studies and advance the field of research. We hope that this paper can be used as a guideline for designing this type of studies and contribute to a common knowledge base regarding CCC in modern dairy production.

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