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Farmers' beliefs and voluntary vaccination schemes: Bluetongue in Dutch dairy cattle

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ABSTRACT

Background: This research utilizes the Reasoned Action Approach framework to study which beliefs drive the intention of farmers to participate in a voluntary vaccination scheme against Bluetongue.
Scope and approach: Knowing the driving beliefs can help in selecting an appropriate mix of policy instruments to enhance the participation rate and thereby improve the cost-effectiveness and efficiency of voluntary vaccination strategies. Results are used to evaluate the policy instruments used by the Dutch government in their 2008 vaccination strategy (communicative intervention and vaccine subsidization).
Key findings and conclusions: The paper posits that social interaction mechanisms, such as peer group pressure, might advance the design of voluntary vaccination strategies.

Introduction

Voluntary schemes are increasingly used in the governance of a secure and safe supply of food. For many issues, such as the veterinary and (phyto)sanitary safety, the governance is shifting in the direction of a more neoliberal model of cost and responsibility sharing (e.g. Enticott et al., 2014; Maye et al., 2014). Economic theory postulates that self-regulation may result in successful interventions at lower public cost (e.g. Oude Lansink, 2011). The *ex-ante* transaction costs of lobbying and legislation and *ex-post* transaction costs of surveillance and enforcement are minimized (Furubotn and Richter, 1998).

Regarding veterinary safety, governments worldwide agree on controlling animal diseases listed by the World Organisation of Animal Health (OIE) (OIE, 2014). In 2006, the Netherlands was struck by an introduction of Bluetongue (BT), one of such OIE-listed diseases. Given her international responsibilities, the Dutch Ministry installed a package of disease prevention and control measures appropriate for BT (European Council, 2000, 2007). A mass transnational vaccination scheme with a vaccine made available from Spring 2008 onwards, was needed to control the disease (Sok et al., 2014; Velthuis et al., 2011).

Most European member states opted for a mandatory vaccination scheme, whereas the Netherlands, amongst a few others, opted for a voluntary approach. Two types of policy instruments were deployed to stimulate voluntary participation by farmers. A communicative intervention was implemented in which the Ministry as well as farmer organizations conveyed written or oral recommendations to motivate farmers intrinsically to vaccinate their cattle. Subsidization of the vaccination costs as an extrinsic motivator was another policy instrument put in place (Ministry of Economic Affairs, 2008).

The vaccination scheme, together with the standard prevention and control measures at EU level, was successful as the total number of reported outbreaks in the EU dropped from 45,000 in 2008 to 1118 in 2009, to 176 in 2010, and finally to 39 in 2011 (IFAH, 2012). In the Netherlands, only 66 outbreaks were reported in 2008 compared to more than 6500 in 2007 (Elbers et al., 2009). Accordingly, the voluntary approach was sufficiently effective in controlling the spread from an epidemiological viewpoint. However, it must be noted that the average seroprevalence of antibodies against the BT virus among dairy cattle was already 68% before the vaccination scheme started (Ministry of Economic Affairs, 2008) while it was estimated that approximately 80% of livestock with protecting antibodies – required either by infection or immunization – was probably needed to prevent between-herd transmission (de Koeijer et al., 2011).

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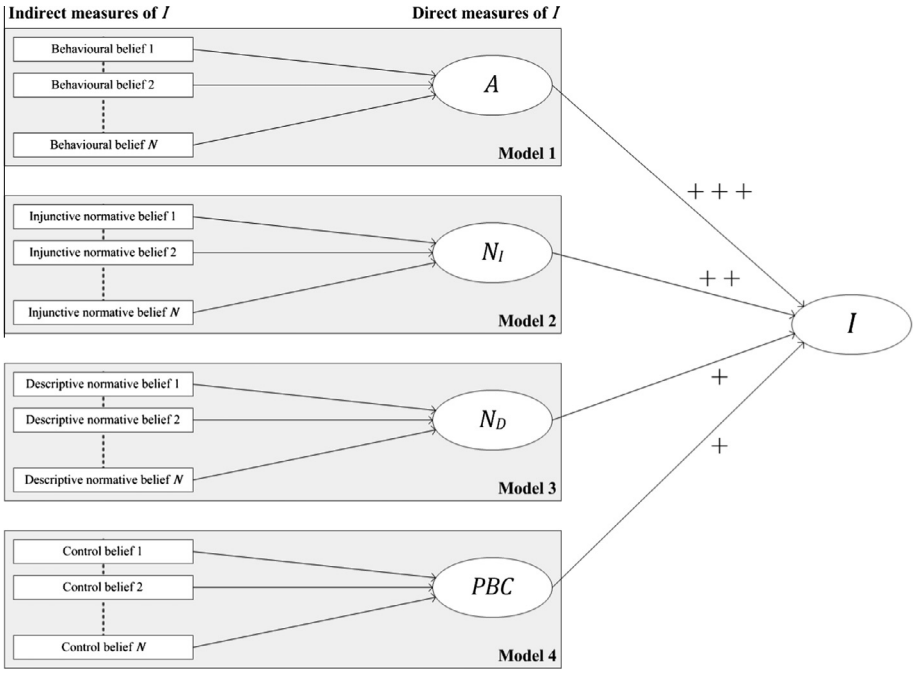

Fig. 1. Framework based on the Reasoned Action Approach (RAA). The number of plusses indicate the relative importance of each construct on intention.

The epidemiological effectiveness of the voluntary approach depends on the level of participation of farmers in the vaccination scheme. The higher the level of participation, the more likely it becomes that the necessary level of immunological protection is reached that is required to disrupt the epidemic spread. As a consequence, also the cost effectiveness (control of the spread of the disease at the lowest costs possible) and the overall efficiency (costs of the vaccination scheme in relation to the benefits) will depend on the participation of farmers. For the past Dutch BT vaccination scheme, the mean level of participation among cattle farmers in 2008 was estimated at 71% and at 57% in 2009 (Elbers et al., 2010).

An exploratory survey among farmers showed that motivation to participate in a voluntary vaccination scheme against BT was driven by economic objectives but also by social–psychological objectives like animal welfare considerations and the perceived need to make a contribution to the eradication campaign (Elbers et al., 2010); these objectives relate to beliefs of farmers. Knowing which beliefs of farmers drive their decision to participate in a voluntary vaccination scheme is important as it can help understanding what kind of policy instruments most likely enhance the level of participation and thereby improve the (cost-)effectiveness and efficiency of voluntary vaccination strategies.

The main contribution of this paper is exploring farmers' beliefs on this subject, as to date they are not well-understood. This study utilizes the Reasoned Action Approach (RAA, Fishbein and Ajzen, 2010). RAA decomposes beliefs into attitudinal, normative and control beliefs. Results are used to evaluate the Netherlands' past BT vaccination strategy and to provide insights that can be used to designing future voluntary vaccination strategies.

Framework

Fig. 1 presents the conceptual framework based on the Reasoned Action Approach that is used in this paper for analyzing farmers' beliefs. The RAA predicts that a given behaviour (B) is determined by the intention (I) to perform the behaviour. I, in turn, is directly explained by four main psychological constructs: attitude (A), the farmers' positive or negative evaluation of performing that behaviour; perceived norms (PN), the social pressures famers perceive to perform that behaviour; and perceived behavioural control (PBC), the perceived own capability to perform that behaviour. Within PN, a distinction is made between injunctive norms (N_I), the perceptions of what referents think one should do; and descriptive norms (N_D), the perceived behaviour of others (farmers). All direct measures explaining I, in turn, are explained by underlying beliefs, which are the indirect measures explaining I.

The abovementioned constructs can be measured either directly or indirectly. Sok et al. (2015)[1] estimated them with direct measures only. This was done for two reasons (Montaño and Kasprzyk, 2008): (1) direct measures are usually more strongly associated with intentions than indirect measures, and (2) the associations between direct measures and intentions indicate the relative importance of the constructs in predicting a given behaviour.

Results revealed that the farmers' intention to participate in a reactive vaccination scheme against BT is mainly attitude-driven, however, normative considerations (social pressures) also influenced intention formation, with injunctive norms being more important than descriptive norms (Sok et al., 2015). Given this result, the relative importance of the constructs on I is indicated in Fig. 1 by the number of plusses, with more plusses indicating a greater importance. This implies that attitudinal and injunctive normative beliefs outweigh the descriptive normative and control beliefs (indirect measures).

The next section elaborates on how beliefs are identified and elicited, and subsequently analyzed to find the drivers behind the intention to participate in a voluntary hypothetical reactive vaccination scheme against BT.

Materials and methods

Identification, elication and models for analyzing beliefs

The first step in applying the RAA is the identification and elicitation of farmers' beliefs. For this step, semi-qualitative interviews were held in May/June 2013 with 7 dairy farmers and 1 veterinarian from different parts within the Netherlands. To obtain a set of

[1] This paper is currently under revision and is part of the same research project. It is based on the same questionnaire that has been used here.