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Communicating quantitative evidence of policy effectiveness and support for the policy: Three experimental studies☆

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ABSTRACT

Increasing the prices of products that harm health is an effective intervention for changing behaviour to improve health but public support for such interventions is generally low. The current paper investigates whether communicating evidence of a policy's effectiveness at tackling the focal problem could increase support. Across three studies we develop an infographic for communicating quantitative evidence of the effectiveness of a hypothetical tax to tackle childhood obesity. We investigate first, whether communicating evidence of effectiveness increases (a) perceived effectiveness (Studies 1,2,3) and (b) support for the policy, and second, whether any increase in perceived effectiveness mediates an increase in support (Studies 1 & 3). In all three studies (combined $N = 9654$) communicating evidence of effectiveness for the intervention increased perceived effectiveness. In Study 1, communicating evidence did not change support for the policy. Variations of the infographic were developed in Study 2 with one emerging as clearer and easier to comprehend. This infographic was therefore used in Study 3 in which it increased support for the tax from 45% to 49%, an effect that was mediated by perceived effectiveness. The effect sizes were small but probably meaningful at a population level. The results of these three studies suggest the potential for presenting quantitative evidence of intervention effectiveness to increase public support. Much uncertainty remains about the most effective ways of presenting this evidence, whether similar effects are achieved by presenting unquantified evidence and whether larger effects might be achieved by presenting information other than effectiveness.

1. Introduction

Public support for an intervention is often critical for policy-makers considering its implementation through policy (Cairney, 2009; Freudenberg, 2014; Cullerton et al., 2016, 2018). This often leads to partisan groups attempting to sway public opinion one way or another (Elliott-Green et al., 2016). Support for large-scale interventions to change behaviour in health and other contexts is highest for information-based interventions, such as public awareness campaigns, that are of limited effectiveness and lowest for price-based interventions such as taxes, that are of higher effectiveness (Diepeveen et al., 2013; Li et al., 2017). When a proposed intervention is unpopular, yet has the potential to have an impact, policy makers may seek to increase public support. We set out to test one set of promising approaches for doing so, namely communicating the effectiveness of a policy.

We test this approach within the context of childhood obesity policies. As a large number of children are currently overweight or obese (28%) in the UK, with the risk increasing among younger UK generations (NHS Digital, 2017; Johnson et al., 2015), there is a growing demand for government to take action. The UK Government's childhood obesity plan highlights the key role of reducing sugar intake via the associated strategies of taxation and reformulation (HM Government, 2018). While most of the focus has been on taxing sugar-sweetened beverages, we explore the public's support for a tax on confectionary due to recent evidence that it may lead to healthier food selection (Smith et al., 2018).

We use the term public support to refer to a construct that describes how individuals feel and think about the implementation or continued existence of a policy proposed by governmental or supranational organisations (e.g., Sekhon et al., 2017). We use this term synonymously with *public acceptability*.

The predictors of policy support include demographic characteristics, such as gender, age, and ethnicity (Barry et al., 2009), beliefs and values of the individual (Barry et al., 2013), and policy specific beliefs,

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such as the perceived fairness and effectiveness of the policy (Bos et al., 2015; Lam, 2015; Mazzocchi et al., 2015; Petrescu et al., 2016; Storvoll et al., 2015). Amongst these various predictors, numerous studies covering multiple fields have determined the perceived effectiveness of a policy to be one of the strongest predictors (Bos et al., 2015; Lam, 2015; Mazzocchi et al., 2015; Petrescu et al., 2016; Storvoll et al., 2015). Targeting people's perceived effectiveness may therefore be an effective way of increasing support for different policies.

Previous attempts at communicating evidence of intervention effectiveness have increased support for various public health interventions such as vaccines, food labelling and incentive schemes to help people quit smoking (Bigman et al., 2010; Pechey et al., 2014; Promberger et al., 2012). It is unknown whether communicating evidence of its effectiveness would increase support for a tax, one of the least popular public policy interventions (Diepeveen et al., 2013; Somerville et al., 2015). The specific outcome that a policy is effective at reducing is also important, as the public values different outcomes differently (Ipsos MORI, 2017). In particular, the public may not only value overall changes in the key outcome, but also reductions in inequalities related to that outcome (Howarth, Marteau, Coutts, Huppert & Pinto, under review). Communicating evidence of effectiveness confounded with other information has also increased support for policies (Bachhuber et al., 2015; Cornwell and Krantz, 2014; Niederdeppe et al., 2015; Ortiz et al., 2016). For example, Niederdeppe et al. (2015) also included information about the nature of the problem and narratives of people affected by the problem. These studies that use evidence of effectiveness to increase support of a policy may be considered a specific case within the wider research on using evidence to change to beliefs (e.g., Lord et al., 1979; Nyhan et al., 2014; Sunstein et al., 2016). This wider research has found similar results, that under certain circumstances communicating evidence can change some peoples' minds, yet identifying whose mind will change and the best methods for doing so is not always clear.

Communicating evidence takes many forms and these can be evaluated within the context of both risk communication and science communication literature (Logan, 2001; Spiegelhalter, 2017). Evidence of effectiveness can be communicated in different ways including quantitative estimates (e.g., childhood obesity would be reduced by 2%), qualitative estimates (e.g., childhood obesity would be reduced by a lot), and assertions (e.g., childhood obesity would be reduced; Bachhuber et al., 2015; Bigman et al., 2010; Cornwell and Krantz, 2014; Niederdeppe et al., 2015; Promberger et al., 2012). Quantitative estimates are under-used, yet preferable due difficulties in discerning to what qualitative distinctions refer (e.g., what is the difference between very effective and extremely effective?; Spiegelhalter, 2017; Zipkin et al., 2014). The use of visual representations of information such as icon arrays can also be particularly useful for increasing understanding when paired with numerical estimates, including those with low numeracy (i.e. those who struggle to understand numbers; Kreuzmair et al., 2016; Spiegelhalter, 2017). With quantitative communication, the effectiveness must also be framed positively or negatively (10% effective vs 90% ineffective). Positive framing appears to lead to greater support towards the policy (Bigman et al., 2010). Although much is left to be discovered about optimal communication methods, following current guidelines is the best practice (see Spiegelhalter, 2017; p53-54). In the current paper, we primarily used visual representations of the effectiveness using quantitative estimates. These provide specific estimates in a clear way.

The aim of the studies in the current paper is to test whether communicating evidence of effectiveness changes participant's beliefs about the effectiveness of a policy, and whether this then leads to greater support for the policy. It is predicted that communicating evidence that a policy is effective at reducing obesity or reducing inequalities in obesity will lead to greater support for the policies. Values and beliefs were also tested as moderators to see if different participants respond differently to the evidence.

2. Study 1 – Communicating quantitative evidence of effectiveness of the sweet tax

The aim of Study 1 was to estimate the effect on support for a policy of communicating different types of quantitative evidence of that policy's effectiveness and to determine the mechanism for this effect. Specifically, the evidence includes the effects of the sweet tax on overall childhood obesity rates and on inequalities in childhood obesity rates. We predict that reducing inequalities and reducing overall rates by a greater degree will increase support for the sweet tax.

2.1. Method

The study was preregistered with the Open Science Framework (DOI: https://osf.io/nckdj/?view_only=12ee76cb0cd848fc86591ec3163cda51).

2.2. Participants

A power calculation suggested that at least 1566 participants would be needed to provide 80% power to detect small effects $f = 0.10$ with a Bonferroni adjustment ($\alpha = 0.005$) applied to the moderation analyses. Two research agencies (Onepoll; Viga) recruited the participants to be representative of the English population based on age, gender, and socioeconomic status. 2031 participants entered the study, 158 were rejected due to a full quota, 178 were screened-out due to ineligibility (26 were not from England; 152 were using their mobile device to access the survey), 20 did not finish the entire survey (completion rate 98.7%), and 107 participants were removed for failing a quality control question. The relevant quotas were "topped-up" after the quality control exclusions to ensure a representative sample, resulting in $N = 1568$. See Table S1 for the demographic characteristics of the sample.

2.3. Design

The study was conducted online and hosted on www.eu.qualtrics.com. It involved a between-participants design, with seven groups, varying in: Presentation of evidence of distributional impact (population effects only; population effects + reduces inequality; population effects + increases inequality) and Size of effect (small; large), with one control group given no evidence (see Box 1). The Qualtrics randomisation feature randomly assigned participants to one of these seven groups. The control group was weighted to receive three times as many participants as the other individual groups to ensure equal sample sizes for analysis. Before and after the infographics, participants completed a questionnaire.

2.4. Interventions

For all groups the sweet tax was described in a short vignette:

The government is considering a new policy to reduce the number of children who are obese in England.

This will increase the price of chocolates and sweets by 20%.

This means that:

a chocolate bar that now costs 50p would cost 60p
a bag of sweets that now costs £1 would cost £1.20

This will not affect the price of biscuits or cakes.