Applying Behaviour Change Models to Policymaking: Development and Validation of the Policymakers' Information Use Questionnaire (POLIQ)

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Research

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Applying Behaviour Change Models to Policymaking: Development and Validation of the Policymakers' Information Use Questionnaire (POLIQ).

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Abstract

Background

The purpose of this study was to develop and validate the Policymakers' Information Use Questionnaire (POLIQ) to capture the intention of individuals in decision-making position, such as health policymakers, to act on research-based evidence, in order to inform theory and the application of behaviour change models to decision-making.

Methods

The development and validation comprised three steps: item generation, qualitative face validation, and factorial construct validation. Confirmatory factor analysis was applied to estimate item-domain correlations for five pre-defined constructs relating to content, beliefs, behaviour, control and intent. Cronbach's alpha coefficient was calculated to assess overall consistency of questionnaire items with the pre-defined constructs. Participants in the item generation and face validation were health and policy researchers and two former decision-makers (former assistant deputy ministries) from Canadian provincial level. Participants in the construct validation were 39 Canadian decision-makers at various positions of municipal, provincial, and federal jurisdiction who participated in a series of policy dialogues focused on childhood disability research.

Results

Internal consistency of items belonging to the respective questionnaire domains was moderate to high with estimated Cronbach's α values ranging from 0.67 to 0.84. Estimated item-domain correlations indicated moderate to high measurement performance for the domains norm, control and beliefs, whereas weak to moderate correlations resulted for the constructs content

and intent. Estimate imprecisions of factor loadings (95% confidence interval widths) were considerable for the questionnaire domains content and intent.

Conclusion

The study findings provide initial evidence on face validity and appropriate measurement properties of the POLIQ based on a convenient sample of decision-makers in social and health policy. Larger validation studies in relevant populations are needed to further establish psychometric properties and utility of the POLIQ.

Keywords

questionnaire, tool, validation, policymakers, behaviour change, evidence-based

Introduction

While behaviour change models have been applied at the individual level of change, e.g., in testing drivers of the public's adoption of, adherence to, or perceptions of healthy behaviours, there is less evidence on behavioural change from the perspective of decision-makers, who influence decisions that shape the macro context where health behaviours occur. The importance of the use of evidence-based knowledge into policy making at governmental and organizational levels has been well recognized but there is evidence to suggest that translating this knowledge into practice is still a challenge (1).

Despite a broad consensus that evidence should inform policymaking, it is known that the policy process is not linear and involves more than the simple access to information. Similarly to other important behaviour changes such as individual's health behaviours and practitioners' use of evidence-based information, the use of academic evidence to guide health and social policy requires a combination of factors such as: budgetary priorities, political climate, organizational culture, and the presence of windows of opportunity (2,3). However, all of these processes are initially triggered by individuals (hereafter called policymakers), who must make a behavioural decision of accessing and using this information through these nonlinear processes of policy development.

There have been several models for conceptualizing evidence use by stakeholders (4-9). One of them is Larsen's conceptual and instrumental knowledge use (10). In this framework, conceptual knowledge use refers to using knowledge to change the way users think about

issues. Instrumental knowledge use is the concrete application of knowledge and describes changes in behaviour that might, in the long run, change the final outcomes of evidence use in policymaking (10). For example, a decision-maker who is constantly informed by research evidence may, in a moment that decisions must be made, access and use the information made available for him/her in the past. Weiss described several frameworks for knowledge use, including the problem-solving model, the direct application of the results of a study to a decision or using knowledge as “ammunition” to justify, consolidate, or support a decision-making process (9). Beyer and Trice labelled this type of knowledge use as symbolic, when research evidence is used as a political or persuasion tool (4-7,9,11). The conceptual use of knowledge implies changes in knowledge, understanding, or attitudes. Research evidence use in health and social policy can include any of these approaches. Nevertheless, in all models one must consider that research-based information could change thinking and inform decision-making but likely not determine the final course of behavioural action – the resulting policy.

It is known that intention to change is a strong predictor of actual behaviour change (12). Several studies have identified the need to better understand the use of evidence in policy making (3,13,14). However, little is known about the individual level behaviour changes necessary to systematically use evidence to inform the policy making process. In particular, no instruments exist to capture the intention to change behaviour based on exposure to research-based evidence.

This study describes the development of the Policymakers' Information Use Questionnaire (POLIQ), an instrument meant to assess behaviour change constructs for individuals in policy decision-making positions. This questionnaire aims to capture the intention of policymakers (individuals in decision-making positions at government or organizations) to change behaviour by making research-based evidence informed decisions, based on exposure to research information such as evidence briefs and policy dialogues to cite a few.

Methods

Item Generation

The initial version of the POLIQ was developed by combining key elements of the Theory of Planned Behaviour (TPB) Questionnaire (15,16) and existing items from the Communicating Cancer Prevention among State-Level Policy Makers Questionnaire (CCP) (17).

The understanding that people change behaviour according to known steps and organized procedures has been vastly used in implementation science and to inform behaviour interventions in a variety of fields (18). The TPB posits that intention to perform a behaviour is best predicted when individuals have a positive evaluation of the behaviour (attitudes), believe peers will support the behaviour (subjective norm), and perceive the behaviour to be within their capabilities (PBC) (19). It also aligns with Roger's Theory of Diffusion of Innovation which posits that people will disseminate newly acquired knowledge when it resonates with their current needs, when they are in a position to affect change with this information, and when their cultural and ethical values align with the innovation being spread (20).

132 While TPB has often been used in behaviour change research and designing interventions,
133 (15,16) it has not yet been applied to the field of informing policy. TPB factors can be assessed
134 directly (e.g., by asking people to report attitudes, norms, and PBC) or indirectly (e.g., by asking
135 people about specific behavioural beliefs and combining the scores with a paired evaluation of
136 the belief) (see Figure 1). To adapt it to the goals of this project, the TPB's constructs were
137 mapped to each of the TPB constructs namely intention, and the three constructs that feed into
138 intention proximally - belief, norms and control. The focus of the questions was changed to
139 make them refer to the policy briefs provided at the policy dialogue (e.g. where the original
140 question referred to control factors relating to exercise, the questions were changed to control
141 factors relating to policy influence such as resources, relationships and organizational support);
142 and also changed the focus of the normative questions to concern participants' professional
143 peers' perceptions rather than the perceptions of friends and family given the professional
144 context of the dialogues.
145
146 The CCP was designed to examine responses of policy makers to the policy briefs (17). To
147 modify its original items, we changed the introductory paragraphs and survey questions to
148 make them refer to the policy briefs provided at the policy dialogue rather than cancer
149 prevention; removed the open-ended aspects of this survey and only included the Likert scale
150 questions; eliminated questions focused on participants demographic information such as
151 political leaning, income level, family information and health status; added a question to
152 capture stakeholders preferred brief format.
153

154 Then, all modified questions were merged, without associating them to the related constructs,
155 and the POLIQ was created. The following steps were taken to develop further and validate the
156 questionnaire (Figure 2).
157
158 **Qualitative Face Validation**
159 The first step of face validation involved reviewing the questionnaire with experts at the Brain
160 Health conference, in the first week of November 2017. A policy maker (who has also served as
161 an Assistant Deputy Minister in Ontario, Canada) as well as a social work professor from a
162 Canadian University were consulted. While they generally found the length and content
163 reasonable, there was discomfort with the wording of some questions that elicited emotional
164 responses (e.g., do you feel you can use this information to advance personal causes) or
165 perceived as leading questions. In this case, questions were removed or reworded. We were
166 also advised by these expert reviewers to harmonize the Likert scale labels for each question to
167 avoid confusion.
168
169 **Transcultural Adaptation**
170 The questionnaire was developed in English, and translated to French, to account for the two
171 official languages in Canada. To that end, a rapid but rigorous transcultural adaptation of the
172 questionnaire was performed, following methodological guidance developed and previously
173 validated by members of this team (21). The following steps were performed: (1) Two bilingual
174 translators conducted a forward translation from English to French, (2) The two French versions
175 were merged into one version, (3) One bilingual translator conducted a back translation of the

merged version into English, (4) The back translated questionnaire was compared to the original version for discrepancies to be highlighted and resolved, (5) A harmonization meeting was held with the bilingual team members to agree on a harmonized version of the questionnaire in French, (6) Two cognitive debriefing interviews with native French speakers were conducted and feedback was collected on the questionnaire items, and (7) A final team meeting was held to review this feedback and agree on the final version of the French version of the questionnaire.

Data collection

During three policy dialogues held in three Canadian provinces (Quebec, Ottawa and British Columbia), 52 attendees were invited to participate with a final total enrollment of 41 individuals. The policy dialogues were events led by members of this team with the objective of informing policymakers in health and social policy positions about different areas of childhood disability research. The first policy dialogue was conducted in British Columbia, focused on research informing the inclusion of children with disabilities in leisure opportunities with provincial and municipal level government decision-makers, and leaders of large provincial non-governmental organizations. The second policy dialogue was conducted in Ontario, focused on research on rights-based approaches in childhood disabilities and participants were provincial and federal bureaucracy members (disability issues and children and family ministries' representatives). The third policy dialogue was held in Quebec and focused on research-based strategies to include children with disabilities in summer camps and community activities and participants were provincial and municipal elected officials, bureaucracy and NGO leaders.

198 Detailed methodology for the policy dialogues is described elsewhere (22,23). In all three
199 dialogues, participants received an evidence brief two weeks prior to the event, in their
200 preferred language (English or French). Participants engaged in a 3-hour meeting with passive
201 (lecture) and active (facilitated small work group discussions with focused questions and
202 requested feedback and application to the large group) learning and exchange opportunities.
203 Participants were given time to complete the POLIQ immediately after the meeting or asked to
204 complete it within two weeks and return by mail or email, according to their preference.
205
206 **Factorial Construct Validation**
207 The POLIQ is composed of questionnaire items that aim to map three latent domains that lead
208 to the intention to act: beliefs, norms and control. Each of the three domains is comprised of
209 complementary sub domains: beliefs (behaviour and attitude towards beliefs), norms (beliefs
210 and subjective view of those normative beliefs), and control (beliefs and perception of control
211 beliefs). In addition, there are four items that measure four aspects of intention, i.e., “likely to
212 use”, “likely to share”, “intend to use”, “try to use”, and “plan to use”. Each of the
213 questionnaire items measures agreement to the respective item statement on a 5-point Likert
214 scale (1 strongly disagree; 2 disagree, 3 neutral, 4 agree and 5 strongly agree). To reflect
215 possible lack of applicability of a question, a sixth category “not applicable” was added. An
216 additional file shows the questionnaire, the items and respective domains [see additional file 1].
217
218 Confirmatory factor analysis was applied in order to estimate item-domain correlations (factor
219 loadings) for items in each of the five pre-defined domains. Cronbach’s Alpha coefficient was

calculated to assess the overall consistency of questionnaire items within the five pre-defined latent constructs of the questionnaire. Due to the limited sample size, robustness of results was assessed using bootstrap sampling and 95% bootstrap confidence intervals were provided for item-domain correlations and Cronbach's Alpha estimates.

Statistical analyses were performed using R software (24). The Lavaan package was used to perform confirmatory factor analysis and based on the fitted structural model, standardized factor loadings were computed to estimate item-domain correlations. Based on the underlying theoretical model (Figure 3), independence constraints were imposed between the items of the three domains beliefs, control and norms.

Results

Due to incomplete questionnaire responses obtained from two individuals, all statistical analyses were performed using the complete case set of 39 individuals.

Item Response distribution

In Figure 4, the relative frequencies of responses across the 24 questionnaire items are displayed. For all questionnaire items, the relative frequency of strong disagreement and/or disagreement was low (<10% for 22/24 items). Otherwise, moderate heterogeneity and fair prevalence of item responses was observed across all items of the questionnaire domains Norm, Control, and Beliefs. One item ("likely to share") in the domain Intent and two items in the domain Content ("understand", "attention", "useful") indicated low prevalence of strong

agreement (relative frequencies <10%). With a range of 28% to 66%, the prevalence of neutral responses was relatively high across all items. The prevalence of responses indicating a lack of applicability ("N/A") ranged from 0% to 23% across the domains Norm, Control, Beliefs and Intent.

Internal Consistency and Item-Domain correlations

Overall internal consistency of the questionnaire was moderate to high based on the sample data as indicated by a range of Cronbach's α values of 0.67 to 0.84 for the five latent constructs. Overall, moderate to high item-domain correlations were found for the questionnaire items within the five domains based on the study data (Figure 5). However, imprecision of correlation estimates was high for items belonging to the questionnaire constructs 'content' and 'intent', precluding a conclusive assessment.

The results of the confirmatory factor analysis were consistent with the findings of a sensitivity analysis that excluded the construct "content" that embodied the largest number of items and was theoretically considered to be predictive for the remaining questionnaire constructs (Figure 6).

Discussion

The TPB model proposes three constructs that drive behaviour: attitudes, subjective norm, and PBC (15,16). Two of those constructs (subjective norm and PBC) are not modifiable in terms of knowledge translation and implementation science efforts, whereas attitudes towards the

264 information received may be modulated through active implementation strategies (25). In this
265 study we offer additional construct of "content" based on Brownson's work (17), based on the
266 perception that information use in policymaking is highly specific to the perceived applicability
267 of the content delivered to the roles attributed to the individual policymaker and content fit to
268 the policy agendas (26). We use this to develop a tool that knowledge translation scientists can
269 use to look at intention to act based on variables that can be modified. Thus, we draw the
270 associations between this new content variable along with the beliefs variable to understand
271 intention to act in the context of KT to policymaking.
272
273 The distribution of the questionnaire responses indicated a low prevalence of disagreement
274 and strong disagreement across all items. As face validity of the questionnaire was established
275 before deploying the sample survey, it is safe to assume that this skewed pattern of answers is
276 due to the selection of survey participants. Participants in the validation study were participants
277 in a series of policy dialogues in childhood disabilities and were part of an active engagement
278 with the research content provided, and in relation to which they responded the questionnaire.
279 It is unlikely that improper wording of the questionnaire items made it “difficult to disagree”
280 and more likely that the purposeful sampling strategy and the KT strategies used contributed to
281 a higher agreement with pertinence and utility of the research evidence. The relatively large
282 proportion of respondents who neither agreed or disagreed to statements conveyed in the
283 questionnaire may be an indication of hesitation to commit to a definite decision, i.e., may be in
284 line with a social desirability response bias or “diplomatic response behaviour” previously
285 observed among policy makers (27).

Our results, moderate (+0.3 < r < +0.5) to high (r >= +0.5) item-domain correlations for the constructs norm, beliefs and behaviour, are consistent with other studies using the TPB model. In the original TPB we see that the beliefs, (r= +.40) control (r= +.26) and norms (r= +.28) were all associated with intent. This is what we expect and is in line with previous literature using the TPB. When we remove the construct content from the structural model, we observed expected change in the correlation structure: as content was strongly associated with intent (r= +.52), the associations of the constructs control, beliefs and norms increased once content was removed from the model. In the saturated model, content was not associated with beliefs (r= +.03). Interestingly, content was negative associated with control (r= -.29) and norms (r= -.44). These correlations were not surprising as they confirm the perception that policy content should not be associated with the policy makers individual beliefs and values, but rather respond to collective needs and political agendas (28).

Study Limitations

Due to the limited sample size and the relatively large number of estimated parameters of the structural model, precision of estimates obtained was low to fair. However, parameter estimates yielded (with one exception) moderate to high item-domain correlations, indicating consistency with desired measurement properties of the proposed instrument.

The prevalence of neutral responses was relatively high across all items and domains. We believe this is also due to the limited sample size, and the fact that different policymakers attending the events and responding to the questionnaire, were interested in specific items or

308 have roles of conveying information to others (e.g., policy analysts), using information to
309 advocate for their constituency (e.g., NGO leaders) and not making decisions themselves. The
310 target population to receive specific information is primordial when developing KT strategies to
311 inform policymaking. The POLIQ would better suit an audience of individuals at government
312 decision-making positions or bureaucracy directly selecting evidence to inform the leadership
313 about policy options.
314
315 The study findings provide initial evidence on face validity and appropriate measurement
316 properties of the POLIQ based on a convenient sample of health and social policymakers. Larger
317 consecutive validation studies in relevant populations are needed to further establish the utility
318 and further psychometric characteristics of the POLIQ.
319
320 **Conclusion**
321 Implementation of research-based evidence into complex systems such as public health and
322 social policy requires an active development of partnerships across stakeholders in research
323 and policymaking, and a deep understanding of the human behaviours involved in the process.
324 The use of the theory of behaviour change to guide implementation can support the
325 development of better targeted and effective strategies. A standardized questionnaire that
326 accounts for beliefs, control and norms, and content of the research-based evidence, applied to
327 the context of policymaking, can support a better understanding about how individuals in
328 decision-making positions intend to use information provided to them. This knowledge may
329 provide insights into implementation and research-evidence use in policymaking. Researchers

can learn to generate evidence that informs policy and to develop targeted strategies to support sustaining behavioural change of policymakers towards accepting, disseminating, and using research-based evidence.

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Not applicable.

Availability of data and materials

Data are available from the authors

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

KST, RES and TS contributed to the development of the research study and design. KST and JL conducted the policy dialogues. RC drafted the manuscript, and all authors critically reviewed each version of the manuscript and read and approved the final version. HZ and TS analyzed and interpreted the data.

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List of Abbreviations (as they appear in the text)**:**

POLIQ = Policymakers' Information Use Questionnaire

TPB = Theory of Planned Behaviour

CCP = Communicating Cancer Prevention Questionnaire

PBC = Perceived Behaviour Capabilities

Figures:

Figure 1 - The theory of the planned behaviour (19)

Figure 2 - Flow chart Policymakers' Information Use Questionnaire development

Figure-3 – Conceptional item-domain (→) and inter-domain (→) dependencies for the Policymakers' Information Use Questionnaire (POLIQ)

Figure 4 – Response distribution Policymakers' Information Use Questionnaire (POLIQ), sample size n=39

Figure 5 – Estimated item-domain correlations and internal consistency indices (Cronbach's alpha) for the Policymakers' Information Use Questionnaire (POLIQ), sample size n=39

Figure 6 – Estimated item-domain correlations for the Policymakers' Information Use Questionnaire (POLIQ), sample size n=39 [construct 'content' removed from the structural model for purpose of sensitivity analysis]

373 **Additional Material**

374 Additional file 1 (PDF file) – The POLIQ tool - the questionnaire, the items and respective

375 domains.

376

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Figures

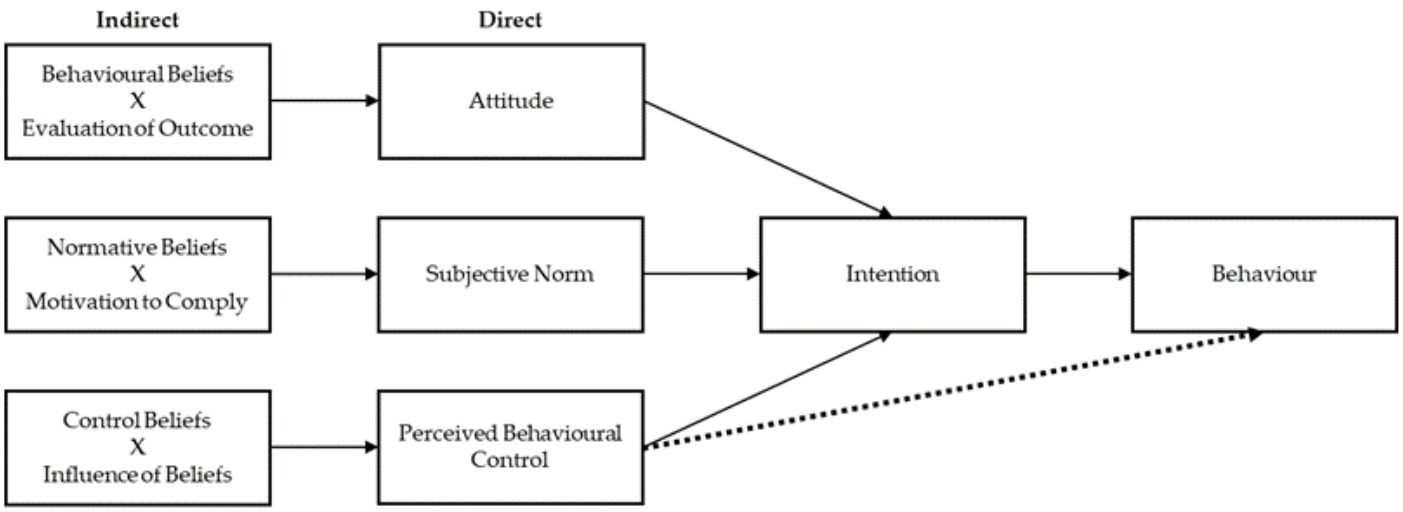

Figure 1

The theory of the planned behaviour (19)

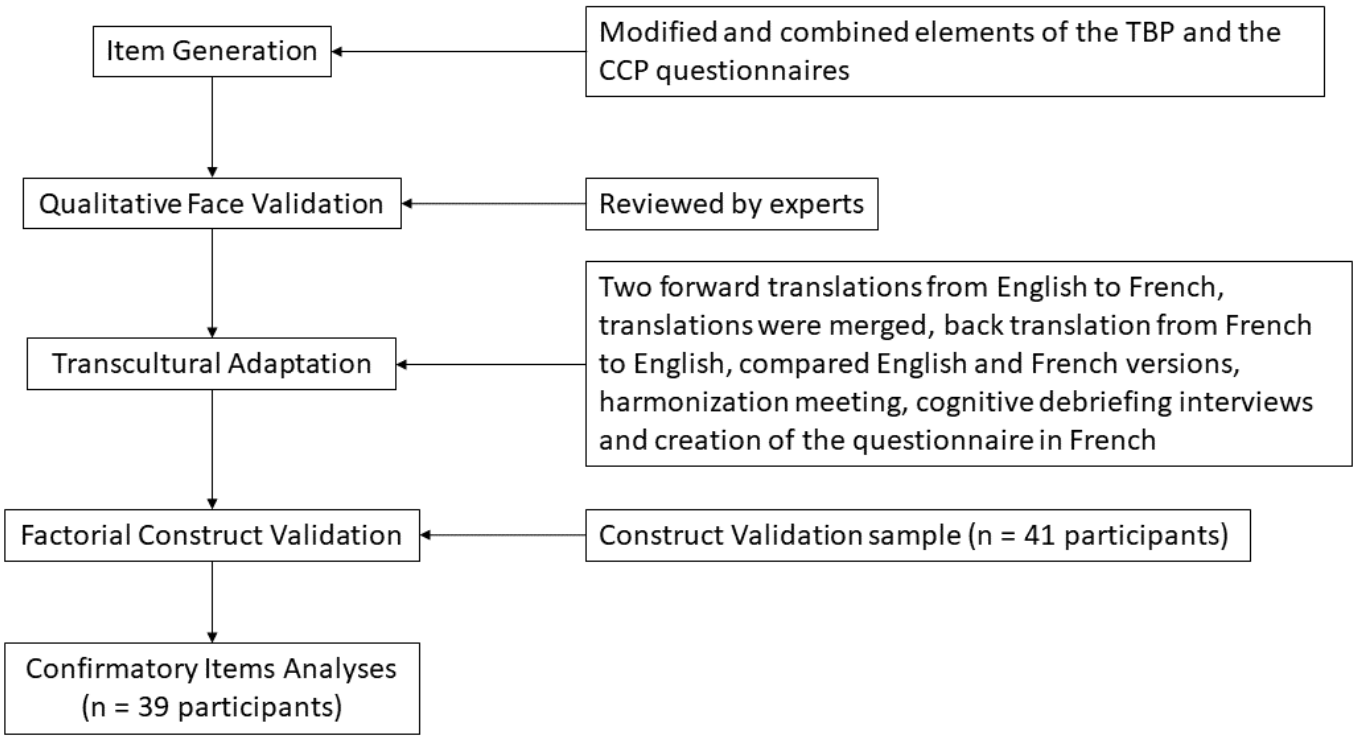

Figure 2

Flow chart Policymakers' Information Use Questionnaire development

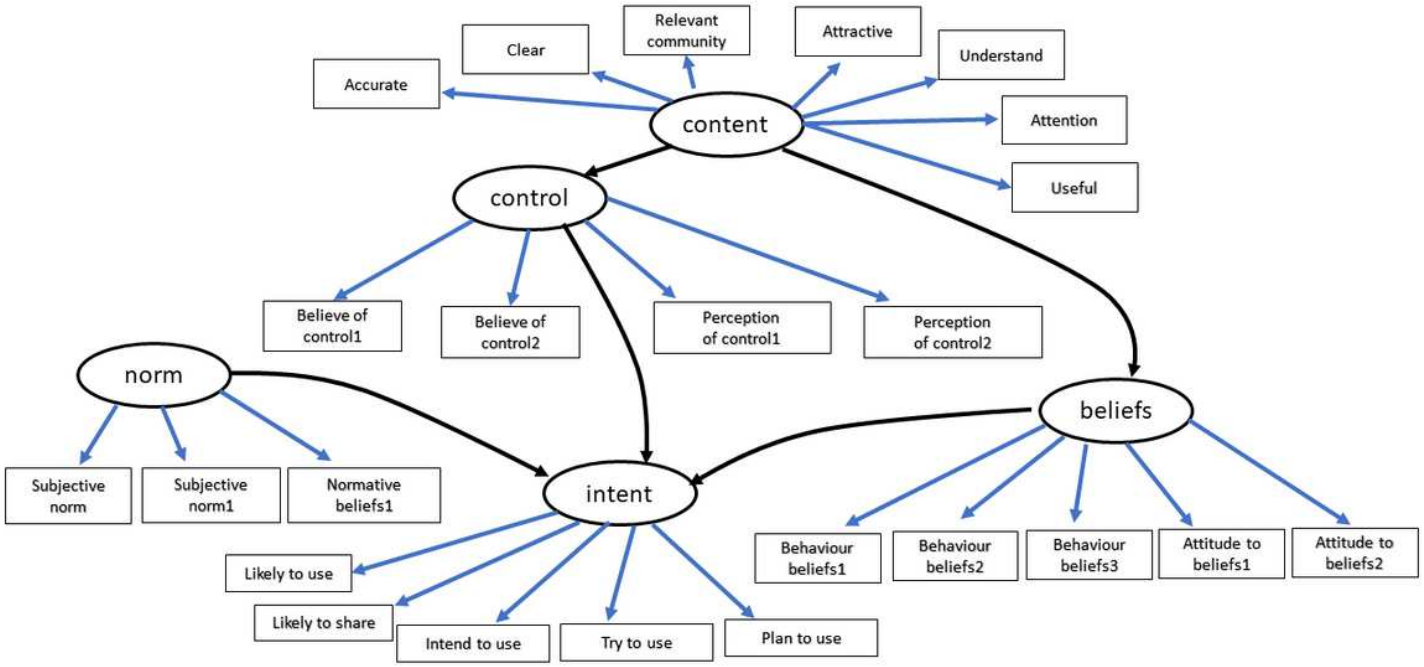

Figure 3

Conceptional item-domain (à) and inter-domain (à) dependencies for the Policymakers' Information Use Questionnaire (POLIQ)

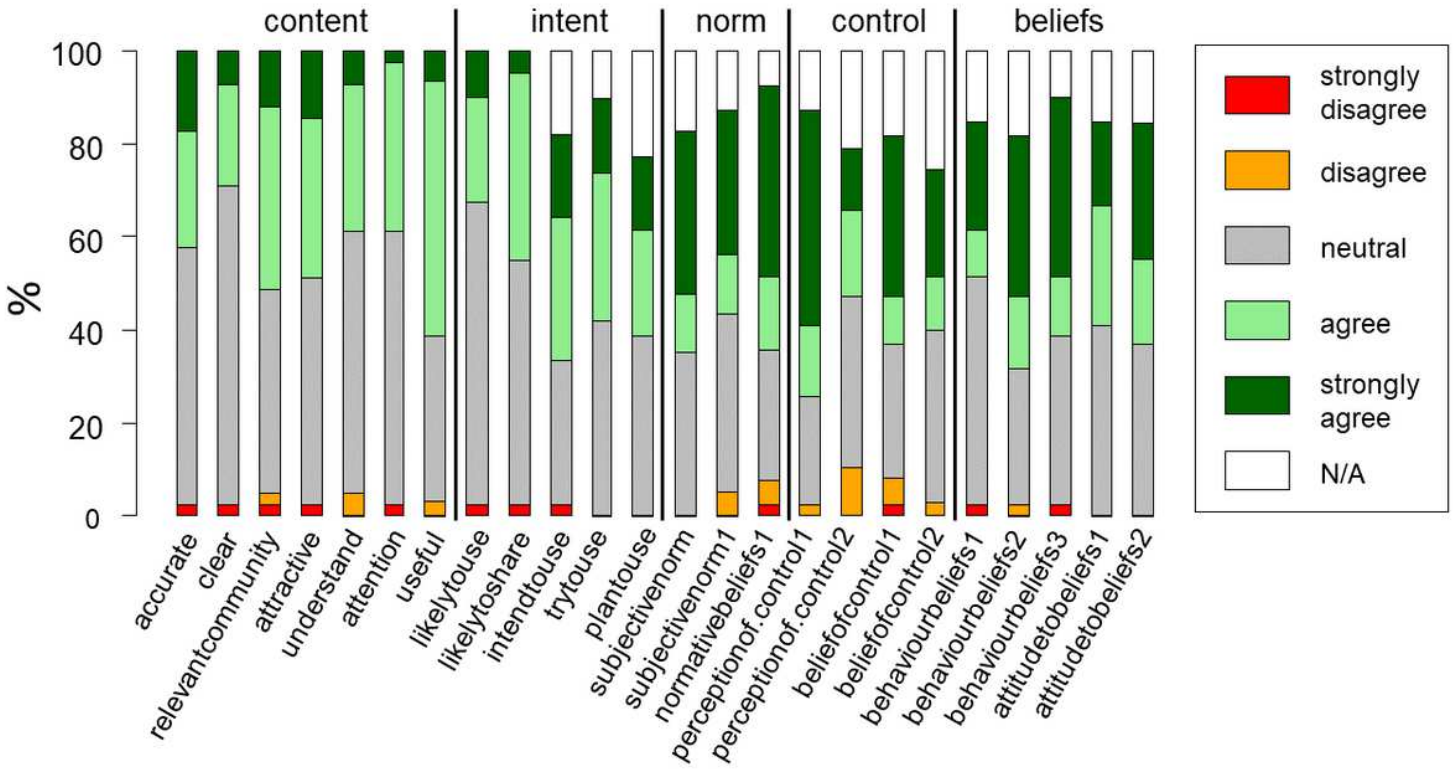

Figure 4

Response distribution Policymakers' Information Use Questionnaire (POLIQ), sample size n=39

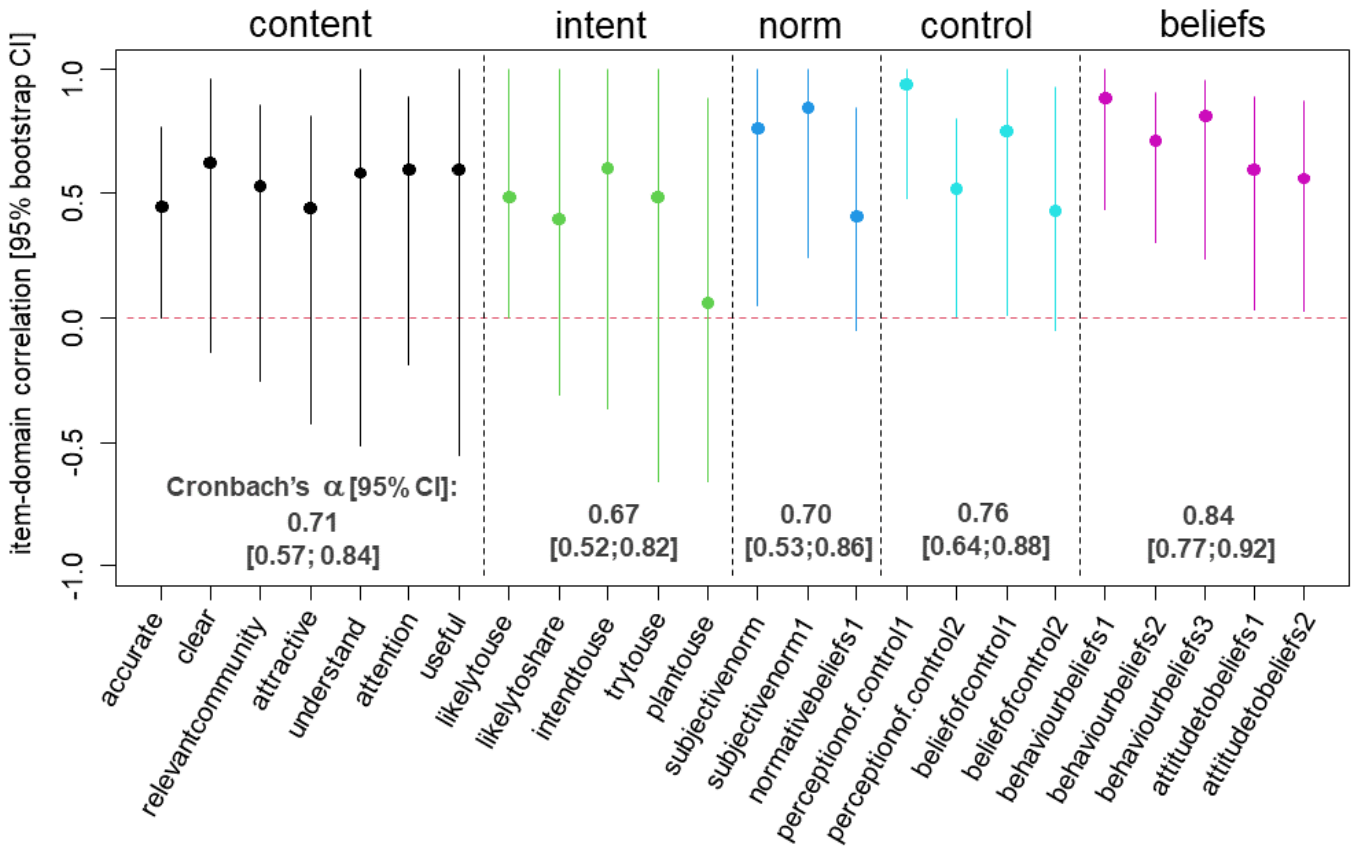

Figure 5

Estimated item-domain correlations and internal consistency indices (Cronbach's alpha) for the Policymakers' Information Use Questionnaire (POLIQ), sample size n=39

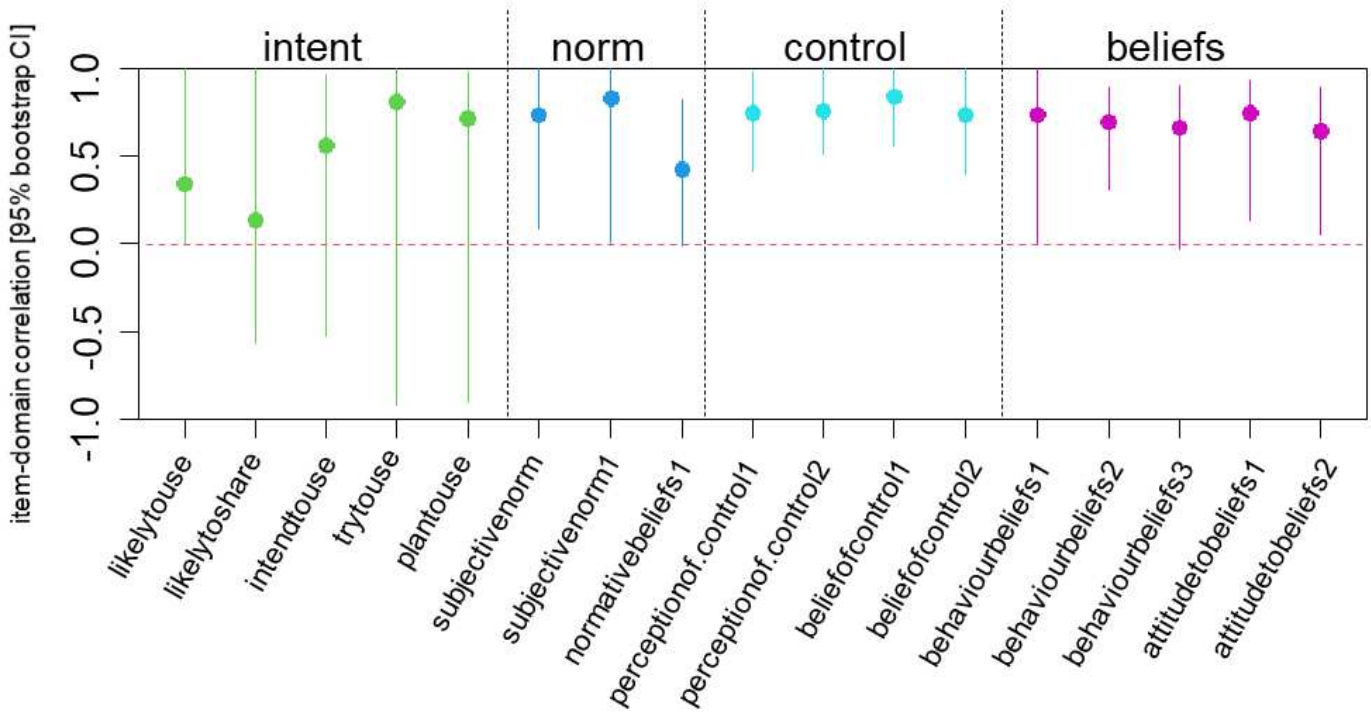

Figure 6

Estimated item-domain correlations for the Policymakers' Information Use Questionnaire (POLIQ), sample size n=39 [construct 'content' removed from the structural model for purpose of sensitivity analysis]

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- Additionalfile1POLIQ.pdf