RESEARCH ARTICLE

Key Points:
- Attributes of potable recycled water message structure and content are tested
- Complex messages and those that communicate about risk are most effective
- Initial attitudes influence responses to recycled water messages

Developing effective messages about potable recycled water: The importance of message structure and content

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Abstract Community opposition is a barrier to potable recycled water schemes. Effective communication strategies about such schemes are needed. Drawing on social psychological literature, two experimental studies are presented, which explore messages that improve public perceptions of potable recycled water. The Elaboration-Likelihood Model of information processing and attitude change is tested and supported. Study 1 (N = 415) premeasured support for recycled water, and trust in government information at Time 1. Messages varied in complexity and sidedness were presented at Time 2 (3 weeks later), and support and trust were remeasured. Support increased after receiving information, provided that participants received complex rather than simple information. Trust in government was also higher after receiving information. There was tentative evidence of this in response to two-sided messages rather than one-sided messages. Initial attitudes to recycled water moderated responses to information. Those initially neutral or ambivalent responded differently to simple and one-sided messages, compared to participants with positive or negative attitudes. Study 2 (N = 957) tested the effectiveness of information about the low relative risks, and/or benefits of potable recycled water, compared to control groups. Messages about the low risks resulted in higher support when the issue of recycled water was relevant. Messages about benefits resulted in higher perceived issue relevance, but did not translate into greater support. The results highlight the importance of understanding people's motivation to process information, and need to tailor communication to match attitudes and stage of recycled water schemes' development.

1. Introduction

Changing rainfall, population growth, and increased demand have placed additional pressure on traditional water supply systems. These pressures highlight the need for alternative supply systems, such as recycled water treatment and desalination, which can augment drinking-water supplies. Despite this, recycled water remains less acceptable to the public than desalinated water [*Dolnicar and Schäfer*, 2009] and community opposition has been a critical barrier to implementation of potable recycled water schemes, due to health risk concerns that withstand scientific assurance of safety [*Khan and Gerrard*, 2006]. Numerous studies have considered community acceptance of recycled water [*Po et al.*, 2003; *Ingram et al.*, 2006; *Hurlimann and Dolnicar*, 2010; *Price et al.*, 2012]; however, there are few which consider how to best communicate about these water supply systems. Research has found that scientists and project leaders implementing recycled water schemes remain uncertain about how best to package information, particularly when trying to reach different audiences and stakeholders [*Russell and Green*, 2009]. The current study draws on social psychological theory to identify strategies for communicating about recycled water. This involves two experimental studies that test the effect of different types of messages on community responses.

1.1. Information Provision About Recycled Water

It has been suggested that provision of recycled water information may help to build trust between communities and water suppliers [*Nancarrow et al.*, 2007]. When it comes to communicating about recycled water, the public are commonly treated as if they have a "knowledge deficit" [*Libutti and Valente*, 2006], and it is erroneously assumed that more detailed technical information is all that is needed to reduce controversy and community opposition [*Russell and Hampton*, 2006; *Nisbet and Mooney*, 2007; *Russell et al.*, 2009]. For communication to be effective, however, the messengers need to be trusted, and the messages need to be accessible and to address key concerns that people have about drinking recycled water.

To date, few studies have empirically tested the effect of providing different types of information about recycled water. Some studies have demonstrated the effectiveness of detailed recycled water information. Participants presented with a 47 page online information booklet demonstrated higher perceived knowledge and acceptance of potable recycled water compared to those who did not view the booklet [*Simpson and Stratton*, 2011]. In another study [*Roseth*, 2008], Australian participants were presented with detailed information about: why water should be recycled; how it is recycled; the safety of the water for various purposes, including cooking and drinking; how it has been used in Australia; and how the use in Australia compares to other countries. The results demonstrated that, relative to a control group, information provision was associated with small but significant increases in the number of people willing to use recycled water for seven out of 13 purposes (including cooking and drinking), along with more positive and less negative attributes associated with recycled water.

Other studies have shown positive effects of providing briefer information. *Dolnicar et al.* [2010] found that community members demonstrated increased willingness to use recycled water for most purposes after receiving simple information about the recycling process, compared to prior. A recent study has also shown that relative to a control group, participants who received brief information about the potable recycled water process, and assurances of it is safety, had more positive responses to the water including: greater support; more positive emotions; and lower risk perceptions [*Fielding and Roiko*, 2014]. There was also evidence that the information influenced behavioral responses to potable recycled water. Participants who received information about the safety of recycled water tended to drink more water that contained recycled water, and were twice as likely to vote in favor of the introduction of a potable recycled water scheme, when compared to the control group.

These studies provide strong evidence for the effectiveness of providing information to improve citizens' responses to recycled water. What past studies have not examined, however, is what aspects of recycled water information may be important for increasing positive responses. As noted above, some of the studies provided detailed and extensive information about recycled water whereas others provided simple, brief information about the recycling process. Furthermore, existing studies of recycled water communication have not drawn on models of attitude change that provide theoretically grounded and empirically tested principles for framing effective and persuasive messages. Understanding the *specific* information that influences people's responses to recycled water, and the best way to frame messages, is crucial for authorities seeking to build trust and support for the introduction of potable recycled water schemes.

The current research draws on social psychological research and the Elaboration-Likelihood Model (ELM) [*Petty and Cacioppo*, 1986] of information processing and attitude change. Consideration is given to the structure and content of messages which encourage positive responses to potable recycled water. In the first study, we address the question of whether simple or complex messages are more effective, and whether messages should acknowledge the positive aspects and/or the criticisms of this water source. This study also examines whether people's preexisting attitudes to recycled water influences their responses to different message attributes. In the second study, we examine the effects of providing information which assures people of the low risks associated with potable recycled water, or the benefits of this source, or a combination of both. The second study also identifies whether the relevance of the issue influences people's information processing and responses to recycled water messages.

1.2. Social Psychological Research on Communication
Past research focusing on communication about recycled water has often failed to draw on the broader social psychological literature which has a long tradition of developing and testing theories of attitude change and persuasion [*Crano and Prislin*, 2006]. Experimental social psychology research has provided robust findings regarding factors that influence the effectiveness of messages, which should inform recycled water communication. Messages have three underlying components: (1) the structure, which includes argument sidedness, conclusions, and sequential order; (2) the content, including evidence and emotional appeals; and (3) the language, such as the speed, intensity, and power of the rhetoric used [*Perloff*, 2010]. In the present research, we focus on the structure and content of messages.

Given the considerable debate that surrounds the introduction of potable recycled water schemes, and the criticisms of opponents to these schemes, it is particularly important to examine the effect of messages that are one or two sided. One-sided messages present only one perspective, whereas two-sided messages

present information that opposes and supports a particular perspective. Past research has usually shown that two-sided messages are more persuasive than one-sided messages, provided that the message refutes the opposing perspective [*Allen*, 1998]. Two-sided messages that explain why opposing perspectives are incorrect can enhance the perceived credibility and trustworthiness of the messenger [*Perloff*, 2010]. These findings suggest that information which acknowledges criticisms of potable recycled water, but provides evidence to refute these criticisms, will be more effective than communication of only the positive aspects of this water source.

Evidence, such as factual and quantitative claims, is often used in attempts to convince people of a position, but for this to be persuasive people must first think carefully about the information provided [*Perloff*, 2010]. The Elaboration-Likelihood Model (ELM) [*Petty and Cacioppo*, 1986] describes the processes by which communication influences attitudes. It provides insight into whether and when simple or complex messages may be more effective. According to this perspective, information is processed in one of two ways. It is processed peripherally (rapidly, and shallowly) under some circumstances, and centrally (more slowly and deeply) in others [*Pierro et al.*, 2005]. When people centrally process information they carefully consider message arguments and implications (i.e., they elaborate upon them). When information is processed peripherally people use cues that are not central to the message, such as the messenger's attributes, or external contextual factors. When evidence is centrally processed, people are thought to have a "high elaboration likelihood" which means that message *content* is more likely to have an impact; however, people need to be motivated and to have the capacity (e.g., time, ability) to process information [*Petty and Cacioppo*, 1984].

Increasing the personal relevance of a message can increase people's motivation to process it centrally, and therefore increase the likelihood of them elaborating upon the information [*Frewer et al.*, 1999]. Messages that are relevant can result in longer-lasting changes in attitudes [*Petty et al.*, 1995]. From this perspective, then, if the issue of recycled water is personally relevant, people will pay more attention to the information. Moreover, complex rather than simple information may be preferred because people are motivated to process the information centrally (i.e., more thoroughly and effortfully). As such, the provision of more detailed and complex information should be more effective when recycled water is a relevant issue.

People's initial attitudes toward the topic of communication can also influence how they engage with information. Those with strong attitudes are thought to be more motivated to pay close attention and process information centrally [*Petty et al.*, 1995]. What past research has not examined is whether preexisting attitudes to recycled water influences responses to communication about this water source. One of the challenges of message framing is the role of attitudes in guiding information processing [*Bohner and Dickel*, 2011]. Past research has shown a moderate overall effect of attitudes on preference for information that is congruent with those attitudes rather than incongruent [*Hart et al.*, 2009], and this effect is more likely when people hold strong attitudes [*Brannon et al.*, 2007]. This suggests that people's prior attitudes will influence how they respond to messages about recycled water. In the present research, we explore the role of prior attitudes in responses to simple and complex, one or two-sided messages about recycled water. Based on past research, we expect people who are neutral or ambivalent about recycled water to respond more to simple compared to complex information, as their elaboration likelihood is lower than people with strong attitudes. People with negative and positive attitudes are expected to be less influenced, as they are less likely to pay attention to incongruent information that could shift to their position.

In addition to examining the efficacy of simple versus complex message content, the present research also examines the efficacy of message content that relates to the risks and benefits of recycled water. There are at least two reasons why it might be important to communicate about risk and benefits. First, risk perceptions are an important determinant of people's acceptance of recycled water, and the risk to human health is the most important issue that people raise in relation to recycled water [*Dolnicar and Schäfer*, 2009; *Hurlimann*, 2007; *Marks et al.*, 2008; *Nancarrow et al.*, 2009]. Second, research has shown that although risks and benefits are often positively correlated, people perceive negative correlations between these variables [*Slovic et al.*, 2004, 2005]. That is, higher risk perceptions are related to lower benefit perceptions and vice versa. In the context of potable recycled water, this would mean that if people perceive that the water source is risky, they will perceive the benefits of it to be lower. Therefore, providing accurate information about the low level of risk and/or the benefits associated with potable recycled water could be an effective way to increase positive responses to this water source.

1.3. The Present Research

This paper describes two experimental studies designed to test the effectiveness of different aspects of message structure and content. A proposed potable (i.e., drinking water) recycled water scheme in South East Queensland, Australia, is used as a case study. The first study investigates the effect of the message attributes of complexity (e.g., simple versus complex) and sidedness (e.g., one versus two-sided arguments) on attitudes toward recycled water for potable use. The study also examines whether individuals' initial stance on the issue (i.e., supporter, neutral/ambivalent, opponent) influences their responses to the information. The second study assesses how messages about the relative risks and benefits of potable recycled water influence support, depending on the personal relevance of the issue. The role of issue relevance in motivating systematic processing of risk information is investigated by comparing the attitudes of South East Queensland residents to those from various other locations around Australia.

Potable recycled water has been a contentious issue in Queensland, as evidenced by the formation of the opposition group "Citizens Against Drinking Sewage" and rejection of a proposed scheme by residents of Toowoomba, Queensland in a referendum in 2006 [*Price et al.*, 2012; *Hurlimann and Dolnicar*, 2010; *van Vuuren*, 2009]. The study area has recently experienced the worst drought on record, prompting the Queensland government to implement a range of drought measures and major infrastructure projects. This included the Western Corridor Recycled Water Project which was intended to provide recycled water to augment drinking-water supplies. Despite completed construction of the infrastructure for this project, implementation of the scheme was put on hold in 2009. At the time of the research, the Queensland government announced that recycled water would only be introduced when dam levels fall below 40% of capacity [*Apostolidis et al.*, 2011], which has not yet occurred. This may be linked to the negative media attention the scheme had attracted [*Roberts*, 2008], which may have affected public support.

2. Study 1

In Study 1, we tested whether the message attributes of message complexity and sidedness influence support for the potable recycled water scheme. Participants completed an initial questionnaire about their support for potable recycled water. At a second time point, they were presented with information about potable recycled water. Consistent with previous research, we expected that two-sided messages would be more effective than one-sided messages at increasing support. In light of recent events in the region, we reasoned that recycled water was of high personal relevance to residents of South East Queensland, and that they would be motivated to centrally process information about recycled water. It was assumed that complex messages with greater detail about the recycled water scheme would be perceived as providing stronger arguments, and would therefore have greater effects than simple messages, *overall*. Finally, we also explored whether initial attitudes to potable recycled water influenced responses to the information. We expected people who have neutral or ambivalent attitudes to be more influenced by the information than those who have positive or negative attitudes. Unlike those with strong initial attitudes, people neutral or ambivalent about recycled water were expected to respond more to simple messages, as their elaboration likelihood is lower, and because those with strong attitudes are less likely to pay attention to incongruent information.

2.1. Methodology
2.1.1. Design and Sampling

The study involved a longitudinal design in which the dependent variables were premeasured at Time 1, and postmeasured at Time 2 after participants received different combinations of recycled water messages. The independent variables were argument complexity (simple, complex) and argument sidedness (one sided, two sided). Participants from South East Queensland aged 18 and over from an online panel of research volunteers were recruited by a social research company. At Time 1, a pretest online survey was conducted in July 2011 to assess baseline attitudes (N = 517). Of those participants who completed the Time 1 survey, N = 415 also completed the experimental manipulations and posttest survey 3 weeks later, forming the sample for final analysis. At Time 2, participants were randomly assigned to receive messages that were either: complex and one-sided (n = 110); complex and two-sided (n = 108); simple and one-sided (n = 95); or simple and two-sided (n = 102). The full set of questions and experimental materials used in the study are available in the online supporting information.

The age and gender profile of the sample roughly accords with known characteristics of the Australian population. There were 44.2% males and 55.8% females. In terms of age range, there were 1.9% of respondents aged 18–24 years, 10.9% aged 25–34 years, 22.3% aged 35–49 years, 37.7% aged 50–64 years, and 27.2% aged 65 and over. In terms of the highest level of education: 2.6% had completed Primary School; 36.0% completed High School, 25.1% had a Trade/Technical Qualification, 20.0% had a Tertiary Undergraduate Degree, and 16.3% had a Tertiary Postgraduate Degree. Weekly household income of the sample ranged from 18.1% earning less than $30,000; 27.4% who earned $30,000–$59,999; 18.8% earning $60,000–$89,999; 12.3% earning $90,000–$119,999; 5.6% earning $120,000–$149,999; 5.3% earning more than $150,000 (12.6% indicated that they preferred not to respond).

2.1.2. Time 1 Survey

Participants were sent an email inviting them to take part in a study about community responses to recycled water. The information sheet made clear that the study involved two phases each taking approximately 15 min. At Time 1, participants completed a survey that was part of a broader program of research about public responses to potable recycled water. Two of the variables measured in the Time 1 survey were used for the present research. Support for potable recycled water was measured with five items, drawn from past research [*Nancarrow et al.*, 2009]. Participants indicated their level of agreement on a seven-point Likert scale (1 = strongly disagree; 7 = strongly agree) to the following statements: *I support adding purified recycled water to the water supply, I do not want purified recycled water to be mixed with drinking water* (reversed), *I would drink the water that's provided by this recycling scheme, Given the choice, I would not drink water that contained purified recycled water* (reversed), *I believe that the recycling scheme would be safe to use.* The mean of the five items formed a support for recycled water scale which showed high internal consistency (Cronbach's alpha = 0.95).

Trust in information [*Frewer et al.*, 1999] from Government was assessed by asking participants to respond to five source attributes on five-point semantic differential scales. Participants were asked *"Considering what you know, please indicate which of the following options best describes your feelings about information from Queensland Government"* using the following scales: 1 = Cannot be trusted, 5 = Can be trusted; 1 = Inaccurate, 5 = Accurate; 1 = Is unfair, 5 = Is fair; 1 = Does not tell the whole story, 5 = Tells the whole story; 1 = Is biased, 5 = Is unbiased. A trust in government information scale was computed by averaging the five items and the scale showed good reliability (Cronbach alpha = 0.95).

To enable the examination of initial attitudes on responses to the information, a tertile split was conducted on the support scale to form three roughly even groups reflecting initial attitudes. The three groups were labeled: supporters (n = 196; $M_{support}$ = 6.32), neutrals/ambivalents (n = 175; $M_{support}$ = 4.63), and opponents (n = 199; $M_{support}$ = 2.38).

2.1.3. Time 2 Experimental Manipulations

At Time 2, participants were presented with one of four messages reflecting the manipulation of message sidedness and complexity. All messages were factually accurate. The one-sided message conditions outlined only the positive aspects of recycled water. Recycled water was described as providing a secure water supply, having environmental benefits by reducing the amount of harmful chemicals going into the local bay, requiring less energy than desalination, providing a safe water source that has not been shown to have negative health effects, and that the advanced technologies are proven and used around the world in similar schemes. The two-sided condition outlined the same positive aspects but also included negative points that have been made by critics. The main criticisms (drawn from media about the issue) were that the water poses a health risk, and that nowhere else in the world is the water used in the same way as planned in the study region. Note that the positive aspects were worded in a way that provided the refutation of the criticisms. Hence the only difference between the one-sided and two-sided conditions was that in the two-sided condition, criticisms of recycled water were included.

Message complexity was manipulated by varying the level of detail provided. Across both conditions, participants received the same key points; however, participants in the complex message condition received more background information. As an example, participants in the simple information condition were told that recycled water requires less energy than desalination, whereas participants in the complex condition received expanded information that pointed out that it takes 1 MW h of electricity to produce 1 ML of

recycled water, compared to 5 MW h of electricity to produce the same amount of desalinated water. The full transcript of information provided in each condition can be found in the online supporting information.

2.1.4. Time 2-Dependent Variables
After receiving this information, participants responded to a questionnaire assessing support for potable recycled water and trust in government information, measured in the same way as the Time 1 survey. The reliability of the support scale and the trust in government information scale was high (Cronbach's alpha = 0.96 and 0.97, respectively).

3. Results

3.1. Overview of Analysis
Two sets of analyses were conducted. A set of 2 (Time: Time 1, Time 2) $\times$ 2 (Message sidedness: one sided, two sided) $\times$ 2 (Message complexity: simple, complex) mixed model Analysis of Variance (ANOVA) were conducted on the key dependent variables (support, trust) to assess changes in support and trust as a function of message sidedness and message complexity. A second set of analyses tested whether responses to the messages are determined by participants' initial attitudes to recycled water. A 3 (Initial attitudes: supporters, neutral/ambivalent, opponents) $\times$ 2 (Message sidedness: one sided, two sided) $\times$ 2 (Message complexity: simple, complex) between-groups ANOVA first assessed whether initial attitudes moderated the effect of the message attributes on Time 2 support for recycled water. A second analysis tested the effects of initial attitudes on trust in government information: A 3 (Initial attitudes: supporters, neutral/ambivalent, opponents) $\times$ 2 (Time: Time 1, Time 2) $\times$ 2 (Message sidedness: one sided, two sided) $\times$ 2 (Message complexity: simple, complex) mixed model ANOVA was conducted with repeated measures on Time. Where significant interactions emerged, they were followed up with simple effects tests.

### 3.2. Analyses Assessing the Effect of Information Provision on Support and Trust
The mixed model ANOVA revealed a main effect of Time on support for recycled water, $F(1, 411) = 19.65$, $p < 0.001$. The effect size was $\eta^2 = 0.05$. Rules of thumb for the size of experimental effects suggest that a partial eta-squared of 0.06 can be considered a medium effect size and 0.14 a large effect [*Cohen*, 1988]. As would be expected, participants had significantly higher levels of support for recycled water at Time 2 (M = 4.55) than at Time 1 (M = 4.38). The main effect of Time was qualified by an interaction with message complexity, $F(1, 411) = 4.09$, $p = 0.044$, $\eta^2 = 0.01$. Simple effects tests showed that participants in the complex conditions recorded significantly higher support at Time 2 (M = 4.60) compared to Time 1 (M = 4.35), $t = -4.67$, $p < 0.001$, however, there was no difference from Time 1 to Time 2 for participants who received the simple message ($t = 1.66$, ns; Ms = 4.41, 4.50, respectively).

The same analyses for trust in government information also revealed a main effect of Time such that trust was higher after receiving information about potable recycled water (M = 2.63) than before (M = 2.41), $F(1, 411) = 10.16$, $p < 0.001$, $\eta^2 = 0.08$. Although the effect did not reach conventional levels of significance, there was some tentative evidence of an interaction between Time and message sidedness on trust in government information, $F(1, 411) = 3.16$, $p = 0.076$, $\eta^2 = 0.01$. The effect is small but suggests that the increase in trust after information provision was greater when the information was two sided ($t = 5.45$, $p < 0.001$; $M_{Time1} = 2.45$, $M_{Time2} = 2.74$) than one sided ($t = 2.85$, $p = 0.004$; $M_{Time1} = 2.36$, $M_{Time2} = 2.51$).

3.3. Analyses Assessing the Effect of Initial Attitudes on Responses to Messages
Apart from the expected main effect of initial attitude group on support, the only other effect to emerge was an interaction between initial attitudes and message sidedness on support for recycled water measured at Time 2 (i.e., after participants received information), $F(2, 403) = 3.19$, $p = 0.046$, $\eta^2 = 0.02$. The interaction is shown in Figure 1. Simple effects analyses to follow-up the interaction showed that receiving one or two-sided messages did not influence supporters' ($M_{onesided} = 6.17$, $M_{twosided} = 6.29$) or opponents' ($M_{onesided} = 2.73$, $M_{twosided} = 2.68$) support for recycled water ($ts < 1$). However, those who were neutral or ambivalent expressed more support when they received one-sided than two-sided messages ($t = 2.69$, $p = 0.008$; $M_{onesided} = 5.20$, $M_{twosided} = 4.70$).

A second set of analyses investigated whether initial attitudes influenced trust in government information as a result of receiving recycled water information. A three-way interaction between Time, message complexity, and initial attitudes emerged, $F(2, 403) = 4.26$, $p = 0.015$, $\eta^2 = 0.02$ (see Figures 2 and 3; note that
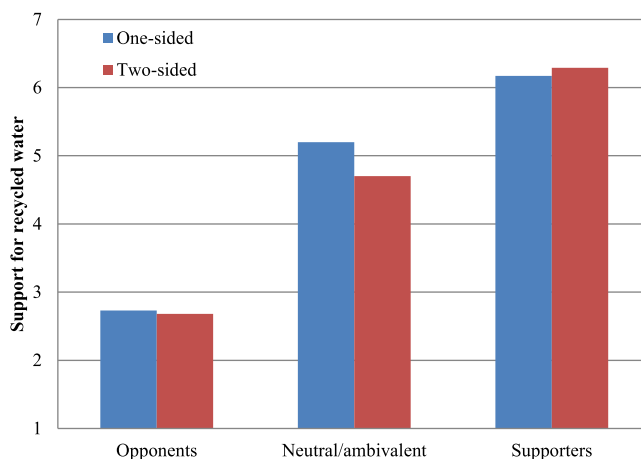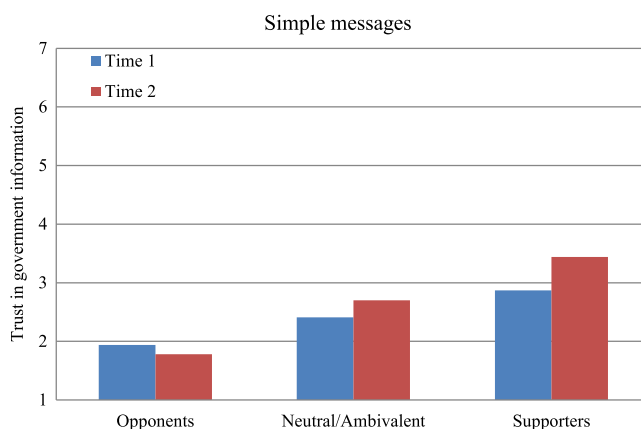
Figure 1. Experiment 1: Time 2 support for recycled water as a function of initial attitudes and message sidedness.

this interaction qualified the main effect of Initial Attitudes and the significant interaction between Initial Attitudes and Time). Simple effects analyses revealed that people who were initially neutral/ambivalent, or supportive reported more trust in government after receiving simple information than before (Neutral/ambivalent: $t = 3.03$, $p = 0.003$; $M_{Time1} = 2.41$, $M_{Time2} = 2.70$; Supporters: $t = 6.10$, $p < 0.001$; $M_{Time1} = 2.87$, $M_{Time2} = 3.44$), whereas opponents' trust declined, although not significantly when receiving simple information ($t = 1.82$, $p = 0.071$; $M_{Time1} = 1.94$, $M_{Time2} = 1.78$). The simple effects analyses also showed that receiving complex information did not influence trust for those who were initially neutral/ambivalent or opposed to recycled water (Neutral/ambivalent: $t = 1.22$, ns; $M_{Time1} = 2.64$, $M_{Time2} = 2.76$; Opponents: $t = 1.30$, ns; $M_{Time1} = 1.94$, $M_{Time2} = 2.07$), but supporters expressed more trust in government after receiving complex information than before ($t = 6.10$, $p < 0.001$; $M_{Time1} = 2.74$, $M_{Time2} = 3.17$).

4. Discussion

Consistent with past research, the results demonstrated that support for recycled water increased after the provision of information [*Dolnicar et al.*, 2010; *Fielding and Roiko*, 2014; *Roseth*, 2008; *Simpson and Stratton*, 2011]. Also consistent with past research, the effect of the information on attitudes was small [*Dolnicar et al.*, 2010; *Roseth*, 2008]. *Cohen* [1988] argues that effect sizes are often small in new areas of behavioral science research because of lack of experimental or measurement control. He also highlights that small effect sizes can be meaningful, pointing to examples of small effect sizes that are nevertheless considered important, for example, adult sex differences. Overall, it was evident that the increase in support was greater when the information presented was complex rather than simple. This latter finding accords with the Elaboration-Likelihood model (ELM), which proposes that people will attend more to message content when they are motivated to engage in effortful processing of information [*Petty and Cacioppo*, 1984, 1986]. We reasoned that the relevance of the recycled water scheme to our participants should mean that they are generally motivated to attend to the information and process it centrally (rather than peripherally). ELM research suggests that when people are motivated to process information centrally strong arguments are more persuasive, as are longer message lengths [*Kruglanski and Thompson*, 1999]. Hence, the finding that community members increased their support in response to complex information that contained more detailed justification of the positive aspects of recycled water is consistent with this explanation.

As expected, initial attitudes to recycled water influenced people's responses to message complexity. People who were neutral or ambivalent reported more trust in government information after receiving simple messages only, whereas those who were supportive reported more trust in response to both complex and simple messages.

Simple messages

Figure 2. Experiment 1: interaction between initial attitudes and complexity of messages on trust in government information: simple messages.
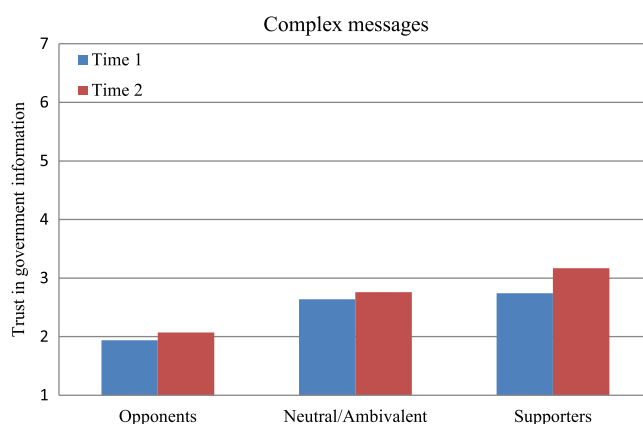
Figure 3. Experiment 1: interaction between initial attitudes and complexity of messages on trust in government information: complex messages.

This is consistent with ELM, as people who are neutral or ambivalent are thought to be less motivated to engage in central processing than people with strong attitudes, and are therefore less likely to pay attention to complex messages. The finding that people supportive of recycled water were positively influenced by both simple and complex messages that outline positive aspects of this water source is also consistent with prior research. This is because those with strong attitudes are expected to pay attention to complex messages, particularly if those messages are *congruent* with their attitudes.

Interestingly, there was no effect of message sidedness when examining the effects of information on the sample as a whole; however, those who were neutral/ambivalent expressed greater support when they received one-sided messages. This finding is consistent with past research that shows that prior attitudes influence information processing and subsequent responses to persuasive messages [*Bohner and Dickel*, 2011; *Hart et al.*, 2009], but is at odds with findings that two-sided messages are more persuasive than one-sided messages [*Allen*, 1998; *O'Keefe*, 1997]. It may be that for people who are ambivalent or undecided, unambiguous information helps them to decide what to think. This finding may have implications for communication about recycled water in contexts where the public hold ambiguous attitudes: some aspects of messages may be more effective at influencing those who do not already hold strong attitudes for or against recycled water.

Our findings also shed light on whether the provision of information about recycled water influences trust in government. Trust increased after the provision of information and there was tentative evidence that two-sided information was somewhat more effective at increasing trust. A possible explanation for the somewhat greater efficacy of two-sided messages on trust building is that recycled water has been a possibility in Queensland for a number of years, and many participants may have already heard arguments for and against. When both sides of the story are presented, this may be interpreted as evidence that the provider of the information has nothing to hide.

5. Study 2

Study 1 provides further evidence of the efficacy of providing information about recycled water as a way to increase support for this water source. It is also the first study to identify specific attributes of recycled water messages and to test their effectiveness for increasing support and trust. In the second study, we focus on message content and investigate whether messages that contain information about benefits and/or risks influence support for potable recycled water. We reason, consistent with the Elaboration-Likelihood Model, that when issue relevance is high, people use central processing and pay more attention to the content of messages. As such, South East Queensland residents were expected to respond more to information about the relative risks or benefits of a proposed potable recycled water scheme in SEQ than residents of other locations in Australia.

6. Methodology

6.1. Design and Sampling

The study involved the manipulation of three independent variables: relative risk (no risk information, low risk information), benefits (no benefit information, high benefit information), and issue relevance: (low, high). Participants from South East Queensland (high issue relevance) and other parts of Australia (low issue relevance) were randomly assigned to one of eight experimental conditions where they received different messages about the low risks and/or benefits of the South East Queensland recycled water scheme (see Table 1). Participants 18 years of age and over from South East Queensland (n = 468) and other Australian locations (n = 489)

Table 1. Study 2 Experimental Conditions

Issue Relevance	Risks	Benefits
High (Queensland)	No info (n = 236)	No info—CONTROL (n = 118)
		High Benefits (n = 118)
	Low risks (n = 253)	No info (n = 125)
		High Benefits (n = 128)
Low (Elsewhere)	No info (n = 226)	No info–CONTROL (n = 117)
		High Benefits (n = 109)
	Low risks (n = 242)	No info (n = 121)
		High Benefits (n = 121)

were recruited from an online panel to participate in June 2012. The experimental design and N for each condition is shown in Table 1. Participants receiving no information about risks or benefits from South East Queensland and other regions of Australia comprised the two control groups. The full set of questions and experimental materials used in Experiment 2 are available online in supporting information.

Approximately 48.9% of the sample was from SEQ (high issue relevance) with the rest of the sample comprised of participants in other states and territories of Australia (low issue relevance): 19.1% New South Wales, 16.4% Victoria, 5.5% South Australia, 6.1% Western Australia, 2.3% Tasmania, and 1.7% ACT. The age and gender profile of the sample roughly accords with known characteristics of the Australian population. The sample comprised 49.4% males and 50.6% females. In terms of age, there were 7.5% aged 18–23 years, 23.4% aged 24–39 years, 26.1% aged 40–55 years, 23.6% aged 56–65 years, 15.0% aged 66–75 years, and 4.3% more than 75 years old. For annual household income, there were 20.0% earning less than $30,000, 25.1% earning $30,000–$59,999, 19.4% earning $60,000–$89,999, 11.2% earning $90,000–$119,999, 7.7% earning $120,000–$149,999, and 5.0% earning more than $150,000 (and a further 11.6% preferred not to answer). In terms of highest level of education, 1.1% of the sample reported Primary School only, 31.1% had High School, 28.9% had a Trade/Technical Qualification, 23.3% had Undergraduate Tertiary, 15.5% had Postgraduate Tertiary education.

6.2. Experimental Manipulations

Participants were sent an email inviting them to take part in a study about community responses to recycled water. As noted above, issue relevance was manipulated through the region that participants lived in. Recycled water was considered to be of high relevance to participants residing in South East Queensland where the potable recycled water scheme is proposed, and of low relevance for people living in other parts of Australia where (at the time) potable recycled water schemes were not proposed. Participants from South East Queensland were also asked to pay close attention to the information provided as this technique is considered to encourage central route processing. Participants either received information that described the scheme as low relative risk, or received no risk information. For example, information was provided about: the advanced treatment process; water quality monitoring; minute levels of hormones and pharmaceuticals; small probability of health impacts; and safety compared to current drinking-water and everyday risks. The risks of recycled water were also put in a broader context. For instance, people were told that "*A person would have to drink 2 litres daily for 138,000 years to consume 100 mg of pharmaceuticals*" and that "*People are far more likely to get pathogens and viruses from shaking hands or going to a day-care or school.*"

Participants either did not receive information about the benefits of recycled water or were provided with a list of benefits including: health and safety; relative cleanness; reduced carbon emissions compared to desalination; economic efficiency; reduced pollutants; conservation of water; opportunities for growth; and improved water security. For instance, people were told that "*By recycling instead of wasting water that is already available less water will be extracted from water systems that are under pressure*" and that "*Only one megawatt hour of electricity is required compared to 5 megawatts hours for desalinated water.*" The full transcripts provided to participants are available in the online supporting information.

6.3. Dependent Variables

Participants completed a questionnaire that measured their support for recycled water in the same way as Study 1. The support scale was computed by averaging the scale items (after negatively worded items were reversed) and it showed good internal consistency (Cronbach's alphas = 0.94).

To assess the effectiveness of experimental manipulations, participants were asked about perceived risks, benefits, and issue relevance using items adapted from *Frewer et al.* [1997]. Issue relevance was assessed by asking participants to indicate their level of agreement with two statements on a nine-point scale: "*I think that the information that I have just read is very relevant to me personally*" (1 = agree strongly, 9 = disagree

strongly); *"How relevant is purified recycled water to you?"* (1 = not at all relevant, 9 = extremely relevant). The two items were highly correlated ($r = 0.72$, $p < 0.001$) and were therefore averaged to form a perceived relevance scale. Perceived risks were assessed by asking participants to indicate their level of agreement with four statements on a nine-point scale (1 = strongly agree, 9 = strongly disagree): *"Purified recycled water has a number of risks; I think that I am personally at risk from purified recycled water; I think that the average person in South East Queensland is at risk from purified recycled water; People are exposed to so many risks everyday that the risk of purified recycled water is too small to worry about* [reversed].*"* Perceived benefits were assessed by asking participants to indicate their level of agreement with three statements on a nine-point scale (1 = strongly agree, 9 = strongly disagree): *"Purified recycled water has a number of benefits; I think that I will personally benefit from purified recycled water; I think that the average person in South East Queensland will benefit from purified recycled water."* After reversing negatively worded items, average scores were computed for each variable. Perceived risks and benefits demonstrated good internal consistency (Cronbach's alphas = 0.90 and 0.88, respectively).

7. Results

A series of 2 (Issue relevance: low, high) × 2 (Risk information: none, low risk) × 2 (Benefit information: none, high benefit) ANOVAs were conducted to check on the effectiveness of the manipulations and to test the effects of the manipulations on support for potable recycled water. Interactions were followed up with simple effects tests.

7.1. Analyses Checking Manipulation of Independent Variables

As expected, there was a large main effect of issue relevance on the extent to which participants thought that the issue of recycled water was relevant to them, $F(1, 949) = 111.73$, $p < 0.001$, $\eta^2 = 0.11$. Participants from South East Queensland (M = 6.67) reported greater relevance of recycled water than those from other regions in Australia (M = 5.33). Unexpectedly, those in the condition that heard about the benefits of recycled water also reported greater relevance than those who were not presented with benefits, however, this effect was much smaller than that of issue relevance manipulation ($F(1, 949) = 5.06$, $p = 0.025$, $\eta^2 = 0.01$; Ms = 6.14, 5.86, respectively). No other significant effects emerged on this measure ($Fs < 1.11$).

The provision of benefit information had the expected effect on the perceived benefits of recycled water, $F(1, 949) = 5.45$, $p = .021$, $\eta^2 = 0.01$. Consistent with the manipulation, participants who were informed of the benefits of recycled water judged that there were greater benefits of this water source than those who did not receive this information (Ms = 5.74 and 5.42, respectively). Interestingly, there was also a main effect of the risk information condition on perceptions of benefits, $F(1, 949) = 6.89$, $p = 0.009$, $\eta^2 = 0.01$, showing that participants who received information about the low risk of recycled water had greater perceptions of the benefit of this water source (M = 5.66) than did participants who did not receive risk information (M = 5.34). There were no other significant effects on the benefits manipulation check scale ($Fs < 1.8$).

Finally, the expected main effect of risk information condition emerged on the measure of risk perceptions, $F(1, 949) = 11.95$, $p = 0.001$, $\eta^2 = 0.01$. Participants who had received information about the low risks associated with potable recycled water had lower risk perceptions than those who did not receive this information (Ms = 4.02, 4.47, respectively). An interaction of issue relevance and risk information condition also emerged, $F(1, 949) = 6.41$, $p = 0.012$, $\eta^2 = 0.01$. Simple effects tests showed that risk perceptions were only significantly lower in the low risk information condition compared to the no risk information condition when the issue was of high relevance (i.e., South East Queensland participants) ($t = 4.18$, $p < 0.001$; $M_{noriskinfo} = 4.76$, $M_{lowriskinfo} = 3.98$) and not when the issue was of low relevance ($t < 1$, *ns*; $M_{noriskinfo} = 4.18$, $M_{lowriskinfo} = 4.06$).

In summary, there was general support for the manipulations. South East Queensland participants perceived that recycled water was more relevant to them than participants from other parts of Australia. Furthermore, participants who were provided with information about the benefits of recycled water perceived greater benefits relative to the no information control conditions. Participants who received information about the low risks of recycled water also had lower perceptions of risk relative to the control, but only for those participants for whom the issue was relevant.

7.2. Analysis of Support for Potable Recycled Water

A main effect of risk information was revealed, $F(1, 949) = 8.47$, $p = 0.004$, $\eta^2 = 0.01$, that was qualified by an interaction with issue relevance, $F(1, 949) = 5.84$, $p = 0.016$, $\eta^2 = 0.01$. Simple effects tests showed that for participants in the high issue relevance condition, being provided with information about the low risks of recycled water resulted in higher support (M = 4.62) than when information was not provided (M = 4.05, $t = 3.73$, $p < 0.001$). Providing risk information in the low issue relevance condition, however, did not influence support ($M_{noinfo} = 4.49$, $M_{lowrisk} = 4.54$, $t < 1$). The interaction is displayed in Figure 4. There were no other significant effects on this variable ($Fs < 2.8$).

8. Discussion

The results of Study 2 again demonstrated that the provision of information can influence support for a potable recycled water scheme, although as in Study 1 and past research, the effect of information is small. We discuss this issue in more detail in the conclusions section. The analyses showed that, although participants who received information about the benefits of recycled water perceived this water source to be of greater relevance and benefit than those who did not, these attitudes did not translate into greater support. In contrast, the provision of information about the low risks of potable recycled water resulted in lower perceived risks, higher perceived benefits, *and* greater support for this water source than when no information was provided. It should be noted, however, that risk information only influenced the risk perceptions of people residing in the area where recycled water was to be implemented, for whom the issue was more relevant. The results provide general support for the Elaboration-Likelihood Model, suggesting that when recycled water is relevant, people are more likely to undertake elaborative processing of information about the low relative risks of recycled and respond positively by indicating higher support.

The current study showed that providing information about the low risks of recycled water also influenced benefit perceptions. This finding is consistent with past research showing that people perceive a negative correlation between risk and benefits. That is, if an issue is perceived to be high risk it is also perceived to be low benefit [*Slovic et al.*, 2004, 2005]. It is clear though that the provision of benefit information did not have a similar effect on perceived risk, suggesting that risk information is the more crucial type of information to communicate. Interestingly, when no risk information was provided, low issue relevance participants living outside of South East Queensland demonstrated greater support for recycled water than high issue relevant participants in South East Queensland (Figure 4). One explanation for this is that people may be more favorable toward a scheme when it is hypothetical rather than a real possibility, particularly if people directly affected by such schemes have not had their concerns about risk appropriately addressed. Much of the past research on recycled water attitudes has used survey methods to investigate attitudes to hypothetical recycled water schemes [*Dolnicar et al.*, 2010; *Dolnicar and Schäfer*, 2009; *Marks et al.*, 2008]; and this finding supports claims that actual situations elicit very different responses [*Marks and Zadoroznyj*, 2005].
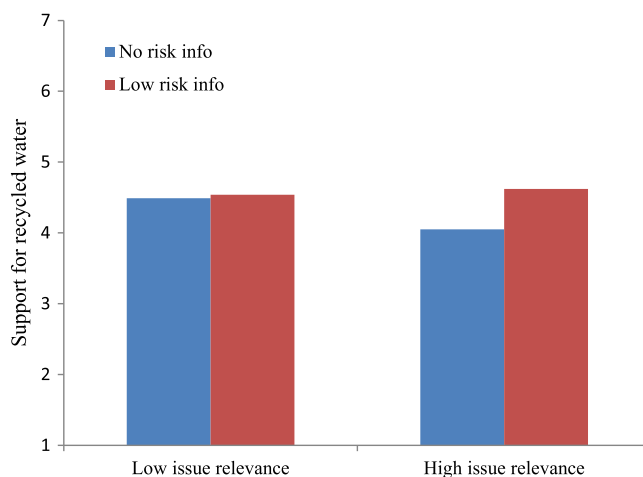

Figure 4. Experiment 2: interaction of issue relevance and risk condition on support for recycled water.

Taken together, these findings suggest different communication approaches for different stages of recycled water treatment schemes. When such schemes are developed and close to implementation, communication of the low relative risks of recycled water is likely to be most persuasive, but only in those areas directly affected. This may involve provision of information about low risks of: the treatment process; water quality monitoring; minute levels of hormones and pharmaceuticals; small probability of health impacts; and safety compared to current drinking-water and everyday risks. When such schemes are in the

feasibility stage, or hypothetical, communication of the benefits of recycled water may help promote recycled water as a relevant issue. Enhanced issue relevance may lay the ground for people to be influenced by risk information at later stages by encouraging central processing of such information. This may involve provision of information about benefits associated with: health and safety; relative cleanness; reduced carbon emissions compared to desalination; economic efficiency; reduced pollutants; conservation of water; opportunities for growth; and improved water security.

9. Conclusions

The present research demonstrates that providing information about potable recycled water increases support for this water source. It also identified specific message attributes that are important to consider when developing recycled water communication materials. The findings suggest that, in general, it is better to provide more comprehensive information about recycled water that not only states the positive aspects, but acknowledges yet refutes criticisms in order to justify the logic for these positive aspects. One caveat is that people who are neutral or ambivalent toward recycled water may respond more positively to simple messages that do not contain additional detail. Designing communication that allows people to process the information at the level that suits their motivation, or elaboration likelihood, is therefore the challenge for communication experts.

Past research has generally shown that people are more persuaded by two-sided messages that present advantages and refute criticisms than one-sided messages that only present advantages. Our research did not replicate this finding, although there was some tentative evidence that authorities who provide two-sided information may be trusted more. In contrast to the general pattern shown by previous research, we found that people who were neutral or ambivalent about recycled water had greater support when they were presented with one-sided than two-sided messages. This highlights the complexity of developing effective communication about recycled water, and the need to consider the audience. In communities or groups where there is a high level of uncertainty or relatively neutral attitudes it may be more effective to present messages that focus on the positive aspects of recycled water (e.g., safety of water source, etc.) as these may help to increase certainty around the issue.

This research also makes clear that communicating information about the low risks of potable recycled water is more critical than communicating about the benefits of the water source. Providing information that the risks of potable recycled water are low can reduce risk perceptions, increase the perception of benefits, and result in greater support for recycled water. Information about the benefits of recycled water schemes can, however, promote greater perceived relevance of the issue. This may set the foundations for people to be influenced by risk information at later stages by encouraging central processing of such information. This highlights the need tailor communication to recycled water schemes' stage of development, altering messages for hypothetical, proposed, or actual schemes.

Although the current research demonstrates the effectiveness of providing detailed information about the low relative risks of recycled water, it must be acknowledged that the effects of the information on risk perceptions and support were small across both studies. As we note earlier in the paper, this is consistent with past research [*Dolnicar et al.*, 2010; *Fielding and Roiko*, 2014; *Roseth*, 2008] testing the effects of information on recycled water attitudes and with *Cohen*'s [1988] assertion that effect sizes are often small in new areas of behavioral science research. The small effect sizes are also not surprising when considering the brief, purely textual, one off, information trialed in both experiments. In practice, information and education campaigns usually provide a greater volume of information on multiple occasions that is accompanied by visual and nontextual communication. More and repeated exposure to specific types of information about recycled water may result in greater shifts in attitudes. The small effects also point to the role that other factors play in influencing attitudes to recycled water. The Toowoomba recycled water referendum highlights the critical importance of biased media reporting, evocative visual campaign materials, and sociopolitical processes in shaping community responses [*Price et al.*, 2012]. It remains unclear how these factors may attenuate or enhance risk perceptions, and influence responses to the information identified here as effective. There is also a need to assess the longevity of the effects of information, and to identify whether there are ways to inoculate people against the counter claims of opposition groups. Past research has shown, for example, that people are more likely to use strategies like counterarguing than derogating the source of the information in order to resist messages [*Jacks and Cameron*, 2003].

Another limitation of the research is that it focused on attitudes rather than actual behavior, such as people's willingness to drink recycled water or vote in favor of a potable recycled water scheme. The focus on attitudinal variables is a limitation of most studies in this area, with the exception of research conducted by *Fielding and Roiko* [2014]. Their research showed that information provision influenced attitudes and behavior similarly; however, further research is needed to confirm that the effects of different types of information (e.g., information that varies in structure and content) extend from attitudes to behavior. Another consideration is that both experiments were conducted online, and it is possible that controlled laboratory and community settings yield different results from the same types of information.

The present research is an initial step toward identifying important attributes of recycled water messages. Future research can build on this by exploring other attributes of recycled water messages, visual communication techniques, and different recycled water contexts and alternative settings. Furthermore, such research could consider other aspects of communication shown to be important, such as the source of the information, and role of personality traits and personal values in motivating information processing.

References

Allen, M. (1998), Comparing the persuasive effectiveness of one and two sided messages, in *Persuasion: Advances Through Meta-Analysis*, edited by M. Allen and R. W. Preiss, pp. 87–98, Hampton Press, Cresskill, N. J.

Apostolidis, N., C. Hertle, and R. Young (2011), Water recycling in Australia, *Water*, *3*, 869–881.

Bohner, G., and N. Dickel (2011), Attitudes and attitude change, *Annu. Rev. Psychol.*, *62*, 391–417.

Brannon, L. A., M. J. Tagler, and A. H. Eagley (2007), The moderating role of attitude strength in selective exposure to information, *J. Exp. Soc. Psychol.*, *43*, 611–617.

Cohen, J. (1988), *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed., Lawrence Erlbaum Assoc., Hillsdale, N. J.

Crano, W. D., and R. Prislin (2006), Attitudes and Persuasion, *Annu. Rev. Psychol.*, *57*, 345–374.

Dolnicar, S., and A. Schäfer (2009), Desalinated versus recycled water: Public perceptions and profiles of accepters, *J. Environ. Manage.*, *90*(2), 888–900.

Dolnicar, S., A. Hurlimann, and L. D. Nghiem (2010), The effect of information on public acceptance—The case of water from alternative sources, *J. Environ. Manage.*, *91*, 1288–1293.

Fielding, K. S., and A. H. Roiko (2014), Providing information promotes greater public support for potable recycled water, *Water Res.*, *61*, 86–96.

Frewer, L. J., C. Howard, D. Hedderly, and R. Shepherd (1997), The elaboration likelihood model and communication about food risks, *Risk Anal.*, *17*(6), 759–770.

Frewer, L. J., C. Howard, D. Hedderley, and R. Shepherd (1999), Reactions to information about genetic engineering: Impact of source characteristics, perceived personal relevance, and persuasiveness, *Public Understanding Sci.*, *8*, 35–50.

Hart, W., D. Albarracín, A. H. Eagley, I. Brechan, J. J. Lindberg, and L. Merrill (2009), Feeling validated versus being correct: A meta-analysis of selective exposure to information, *Psychol.l Bull.*, *135*, 555–588.

Hurlimann, A. C. (2007), Is recycled water use risky? An Urban Australian community's perspective, *Environmentalist*, *27*, 83–94.

Hurlimann, A. C., and S. Dolnicar (2010), When public opposition defeats alternative water projects—The case of Toowoomba Australia, *Water Res.*, *44*(1), 287–297.

Ingram, P. C., V. J. Young, M. Millan, C. Chang, and T. Tabucchi (2006), From controversy to consensus: The Redwood City recycled water experience, *Desalination*, *187*, 179–190.

Jacks, J. Z., and K. A. Cameron (2003), Strategies for resisting persuasion, *Basic Appl. Soc. Psychol.*, *25*(2), 145–161.

Khan, S. J., and L. E. Gerrard (2006), Stakeholder communications for successful water reuse operations, *Desalination*, *187*, 191–202.

Kruglanski, A. W., and E. P. Thompson (1999), Persuasion by a single route: A view from the unimodel, *Psychol. Inquiry*, *10*, 83–109.

Libutti, L., and A. Valente (2006), Science communication and information dissemination: The role of the information professional in the 'Perception and Awareness of Science' project, *J. Inf. Sci.*, *32*, 191–197.

Marks, J., B. Martin, and M. Zadaroznyj (2008), How Australians order acceptance of recycled water: National baseline data, *J. Sociol.*, *44*(1), 83–99.

Marks, J. S., and M. Zadoroznyj (2005), Managing sustainable urban water reuse: Structural context and cultures of trust, *Soc. Nat. Resour.*, *18*, 557–572, doi:10.1080/08941920590947995.

Nancarrow, B. E., Z. Leviston, and D. I. Tucker (2009), Measuring the predictors of communities' behavioural decisions for potable reuse of wastewater, *Water Sci. Technol.*, *60*(12), 3199–3209.

Nancarrow, B. E., Z. Leviston, D. Tucker, M. Po-Greenhill, J. Price, and P. Dzidic (2007), Community acceptability of the indirect potable use of purified recycled water in South-East Queensland and preferences for alternative water sources: A baseline measure, *Tech. Rep.* 1, CSIRO Land and Water, Perth, Western Australia, Australia.

Nisbet, M. C., and C. Mooney (2007), Framing science, *Science*, *316*, 56.

O'Keefe, D. J. (1997), Standpoint explicitness and persuasive effect: A meta-analytic review of the effects of varying conclusion articulation in persuasive messages, *Argumentation Advocacy*, *34*, 1–12.

Perloff, R. M. (2010), *The Dynamics of Persuasion: Communication and Attitudes in the 21st Century*, Routledge, N. Y.

Petty, R. E., and J. T. Cacioppo (1984), The effects of involvement on responses to argument quantity and quality: Central and peripheral routes to persuasion, *J. Personality Soc. Psychol.*, *46*, 69–81.

Petty, R. E., and J. T. Cacioppo (1986), The elaboration likelihood model of persuasion, in *Advances in Experimental Social Psychology*, vol. 19, edited by L. Berkowitz, pp. 123–203, Academic, N. Y.

Petty, R. E., C. P. Haugtvedt, and S. M. Smith (1995), Elaboration as a determinant of attitude strength: Creating attitudes that are persistent, resistant, and predictive of behavior, in *Attitude Strength: Antecedents and Consequences*, edited by R. E. Petty and J. A. Krosnick, pp. 93–130, Lawrence Erlbaum Assoc., Hillsdale, N. J.

Pierro, A., L. Mannetti, H. Erb, S. Spiegel, and A. W. Kruglanski (2005), Informational length and order of presentation as determinants of persuasion, *J. Exp. Soc. Psychol.*, *41*(5), 458–469.

Po, M., J. D. Kaercher, and B. E. Nancarrow (2003), Literature review of factors influencing public perceptions of water reuse, *Tech. Rep*. 54/03, CSIRO Land and Water, Perth, Western Australia, Australia.

Price, J., K. Fielding, and Z. Leviston (2012), Supporters and opponents of potable recycled water: Cultural and cognition in the Tooowoomba referendum, *Soc. Nat. Resour.*, *25*(10), 980–995.

Roberts, G. (2008), Disease expert warns on recycled sewage [online], The Australian, Surry Hills, N. S. W., Australia. [Available at http://www.theaustralian.com.au/archive/news/expert-warns-on-recycled-sewage/story-e6frg6oo-1111117895549, last accessed 1 Oct. 2013.]

Roseth, N. (2008), Community views on recycled water—The impact of information, *Res. Rep. 48*, Coop. Res. Cent. for Water Qual. and Treatment, Salisbury, South Australia, Australia.

Russell, S., and M. Green (2009), An audit of social science questions emerging from south-east Queensland Urban Water Security Research Alliance Projects, report, CSIRO Water for a Healthy Country Natl. Res. Flagship, Canberra, Australia.

Russell, S., and G. Hampton (2006), Challenges in understanding public responses and providing effective public consultation on water reuse, *Desalination*, *187*, 215–227.

Russell, S., C. Lux, and G. Hampton (2009), Beyond ''Information'': Integrating consultation and education for water recycling initiatives, *Soc. Natl. Resour.*, *22*, 56–65.

Simpson, J., and H. Stratton (2011), Talking about water: Words and images that enhance understanding, report, Natl. Water Comm., Canberra.

Slovic, P., M. L. Finucane, E. Peters, and D. G. MacGregor (2004), Risk as analysis and risk as feelings: Some thoughts about affect, reason, risk, and rationality, *Risk Anal.*, *24*(2), 311–322.

Slovic, P., E. Peters, M. L. Finucane, and D. G. MacGregor (2005), Affect, risk, and decision making, *Health Psychol.*, *24*(4), S35–S40.

van Vuuren, K. (2009), Press bias and local power in the Toowoomba water referendum, *Commun. Polit. Cult.*, *42*(1), 55–73.