



## Full length article

## Central or peripheral? Information elaboration cues on childhood vaccination in an online parenting forum

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## ABSTRACT

Parents are increasingly turning to online health forums to discuss their concerns over their children's health and seek advice on health decisions. This study examines the characteristics of elaboration in online forum discussions between parents about the rotavirus vaccine. It establishes the types of central and peripheral message cues parents generated, the extent of their elaboration, and how these exchanges are associated with parents' decisions on their children's vaccination. The results indicated that forum users employed both central and peripheral cues as a joint process when generating information intended to help other parents gain knowledge and make vaccination decisions. Issue-relevant arguments important to vaccination decision included the vaccine's necessity, side effects and efficacy. Peripheral cues including site-generated sorting cues were associated with posts featuring greater elaboration. New parents had the most doubts, asking the most questions about vaccine issues. Their elaboration, however, was the weakest.

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## 1. Introduction

Online self-help and health support groups have become an important resource that provides informational, social and emotional support on a 24/7 basis, allowing individuals to communicate with others who share similar health interests and concerns (Coulson, 2005; Coursaris & Liu, 2009; Eriksson & Salzmänn-Eriksson, 2013). Despite the prevalent use of Internet discussions for health information, these forums provide abundant but unregulated and, oftentimes, conflicting health advice (Berry, Wharf-Higgins, & Naylor, 2007). Childhood immunization, too, is subject to heated debates online that could polarize views that influence risk perceptions and decision-making tendencies (Witteman & Zikmund-Fisher, 2012). The persuasive impact of these online discussions on parents' vaccination decisions may be linked to the extent of elaboration embodied in the forum messages (Zhou, 2012). Messages may contain cogent issue-relevant arguments or present simplistic, superficial attributes, both of which can have variable influence on attitudes and behavioral intentions (Petty & Cacioppo, 1986).

With social internet sites and user-generated content becoming staple health information resources, it is exigent to investigate the characteristics of online health discussions that could influence parents' knowledge and attitudes on pediatric healthcare. While studies have investigated the influence of medical professionals, media representations and costs on parents' attitudes and decisions on childhood immunization (Constantine & Jerman, 2007; Litton, Desmond, Gilliland, Huh, & Franklin, 2011; Mills et al., 2005; Roberts, Dixon-Woods, Fitzpatrick, Abrams, & Jones, 2002; Tickner, Leman, & Woodcock, 2006), there is scant research on the role that online health forums play in vaccination decision-making. This study aims to fill this gap by examining the nature of information elaboration by new parents about early childhood vaccination, focusing specifically on online discussions about the rotavirus vaccine in China.

The rotavirus vaccine in China is surrounded by controversial information on its safety, efficacy and necessity. Prior to the introduction of rotavirus vaccines, rotavirus was the leading cause of severe gastroenteritis in infants and young children globally. In China, for children under 5 years old, rotavirus caused 42.6% of all hospitalizations for severe gastroenteritis and 32.5% of outpatient visits for diarrhea (Liu et al., 2014). The only approved vaccine for rotavirus infection prevention in China is the Lanzhou lamb rotavirus (LLR) vaccine (Fu, Tate, & Jiang, 2010). Despite the severe

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effects of rotavirus, parents are hesitant about vaccinating their children. Several factors contribute to parental indecision about the rotavirus vaccine. First, the vaccine is not mandatory in China, raising question on its necessity. As an optional vaccine, it is unsubsidized. Its high cost, borne fully by parents, serves as another deterrent. The vaccine's safety also came under question in 2010, when Chinese media reported that rotavirus vaccines used in the U.S. were found to contain a form of animal virus. Information about the LLR on China National Immunization Program is overly simplified (NIP, 2014), while information from medical professionals lacks credibility as sale of the vaccine constitutes a profitable business for vaccination clinics (Yin & Gao, 2015). Facing uncertainty over the vaccine's safety and limited information from official channels, parents turn to online forums to seek advice from other parents on the vaccine.

Using aspects of Petty and Cacioppo's (1986) elaboration likelihood model (ELM) for theoretical direction, this study investigates the central and peripheral message cues generated by Chinese parents in their online discussions about the rotavirus vaccine. ELM's focus on the dual message processing routes that occur when people encounter information in relation to their motivation and ability to process information, and the resultant attitudes and behavior provides a useful conceptual framework for a content analysis of online discussion forums. Forum messages are overt expressions of people's elaboration, detailing their consideration, evaluation and judgment of issue-relevant argument or use of heuristic cues. Furthermore, with attitudes guiding decisions and behaviors, as posited by ELM, the extent of elaboration embodied in the messages would vary according to parents' existing attitudes about the vaccine. Capturing actual manifestation of people's information elaboration in online discussions can contribute significantly to updating ELM for the digital age.

The model was developed in the 1980s to explain persuasion processes in the mass media. In today's interactive digital media environment, consumers' access, use and creation of information have changed, leading scholars and practitioners to emphasize the need to examine the applicability and validity of the dual-process routes proposed by the ELM in digital contexts (Hershberger, 2003; Karson & Korgaonkar, 2001; Kitchen, Kerr, Schultz, McColl, & Pals, 2014; Liu & Shrum, 2009; SanJosé-Cabezudo, Gutiérrez-Arranz, & Gutiérrez-Cillán, 2009; Tam & Ho, 2005). Most research applying ELM examined central and peripheral information processing as two separate routes rather than as a joint process with equal degree of elaboration on the continuum. With consumers' access and processing of information changing, scholars have proposed the consideration of central and peripheral processing as a joint process in digital contexts (Kitchen et al.; SanJosé-Cabezudo et al., 2009).

Also requiring improved conceptualization is argument quality (Kitchen et al., 2014). Studies employing ELM in its classic form typically involve experiments, manipulating messages or subjects in controlled settings to determine how cues affect receivers' information perception (Chaiken & Trope, 1999; Chaiken, Liberman, & Eagly, 1989; Petty & Wegener, 1999). Kitchen et al. (2014) pointed out that ELM-based experiments have produced inconsistent findings, with some providing little to no support for the model's postulates (Hershberger, 2003; Karson & Korgaonkar, 2001; SanJosé-Cabezudo et al., 2009). They also noted the difficulties in replicating ELM-based experiments. A likely reason, they explained, is variation in argument quality manipulations across studies. Using content analysis to identify and establish issue-relevant arguments and cues associated with the elaboration can guide the development of consistent measures of argument quality. The use of ELM for content analysis has academic precedent, with studies drawing from the ELM framework to identify message

properties that appeal to different levels of elaboration among consumers (Berry et al., 2007; Cline & Young, 2004; Dunbar, Connelly, Jensen, Adame, & Rozzell, 2014; Frew, Macias, Chan, & Harding, 2009; Liebermann & Hint-Goor, 1996).

In past ELM research, the messages under study were either constructed by media institutions and companies or researchers. None have examined messages constructed by users themselves. Moreover, in experimental studies, participants' elaboration can only be inferred as the cognitive process cannot be captured and the resultant attitude is associated with the inferred elaboration. Discussion forums, however, offer observable evidence of users' elaboration produced based on their existing attitudes. With Web 2.0 and social media, people are no longer mere recipients of crafted messages by institutions but are themselves generating persuasive content. These sites are information elaboration environments, with persuasive messages in the form of text and multimedia content designed to create specific persuasive effects (Tam & Ho, 2005). Research thus needs to shift its focus to messages users are producing.

In this study, we gather organic evidence on the elaboration process as it is being formed in a real-world context – an online parenting forum (Krippendorff, 2012) to determine the types of processing people employ. We identify and analyze the types of message cues produced. We also examine the relationship between parents' motivation and ability, their attitudes and decisions on vaccine adoption, and the forms of elaboration they engaged in. Understanding the forms and structure of these messages, and how they are associated with attitudes, motivations and abilities offer important insights on how ELM can be updated for the digital landscape. This understanding also enables practitioners to better design communication to achieve the desired attitudinal or behavioral outcomes.

## 2. Literature review

### 2.1. Updating ELM for the digital age

Elaboration, which is the extent a person critically thinks about the arguments relevant to an issue or advocacy, occurs at varying degrees on an elaboration continuum, from no or little thought about the issue to complete elaboration, where arguments are examined thoroughly and in detail (Petty & Cacioppo, 1986; Wagner & Petty, 2011). The degree of elaboration on the continuum occurs through central and peripheral information processing routes, which are dependent on people's motivation and ability to process the message presented to them. Motivation is influenced by perceived personal relevance and importance of the issue. Intelligence, time available, level of actual or perceived knowledge, and amount of distraction in the message environment influence people's ability to understand and attend to a message (Petty & Wegener, 1999). With high motivation to process relevant information, people are likely to follow the central route, which involves extensive and effortful issue-relevant elaboration, scrutinizing and uncovering central merits of the information associated with the issue or advocacy (Petty & Cacioppo, 1986; Petty & Wegener, 1999). When motivation and abilities are low, people are likely to employ peripheral information processing, using simple heuristic cues to make judging the merits of an issue position quick and easy (Petty & Wegener, 1999).

Although research applying ELM in digital settings support the dual processing routes (Zhou, 2012), studies have emerged that suggest people may engage differently with online information. In replicating and testing traditional ELM variables in online settings, these studies failed to find the influence of motivation in determining the type of processing, and the moderating effect on

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