



Increasing the regular use of safe water kiosk through collective psychological ownership: A mediation analysis

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ABSTRACT

Unsafe water consumption is the environmental risk factor in sub-Saharan Africa contributing most to premature death. In urban slums and dispersed rural communities, where access to safe water is especially limited, water kiosks are a relevant safe water source. However, irregular use challenges their operational viability and may cause discontinuation. The present study investigated collective psychological ownership for the kiosk as a potential factor to increase *regular* kiosk use. Data were collected cross-sectionally in one urban and two rural kiosk sites through interviews in study households ($N = 205$) and analyzed by path analysis. Involvement in decision-making related to the kiosks explained collective psychological ownership for the kiosks. Collective psychological ownership, in turn, explained self-reported kiosk use through social-cognitive factors. The results emphasize the importance of community involvement in decisions related to kiosk installation and maintenance because it may contribute to regular kiosk use.

1. Introduction

Sustainable use and management of communal resources, such as wildlife, water, air, or forests, is a key challenge facing humanity due to the social dilemma structure it entails. Social dilemmas are situations in which short-term individual interests (e.g. extensive resource use) are in conflict with long-term collective interests (e.g. resource preservation; Brewer & Schneider, 1990). Often, structural solutions (such as rewards or punishments) have been proposed to solve social dilemmas. However, such solutions are often costly to apply and difficult to install (van Lange, Balliet, Parks, & van Vugt, 2014). Recently, it has been suggested that collective psychological ownership might help to overcome social dilemmas (Matilainen, Pohja-Mykrä, & Kurki, 2017). Collective psychological ownership is defined as “the collectively held sense (feeling) [among group members] that there is an ‘us,’ and a collective sense that the target of ownership (or a piece of that target) is collectively ‘ours’” (Pierce & Jussila, 2010). The present paper investigates the potential of collective psychological ownership to encourage cooperative behavior with regard to a specific communal resource, safe water kiosks in Kenya.

Safe drinking water, while abundantly available in some countries, remains a scarcely available communal resource in some regions worldwide. It is estimated that over a quarter of the global population still depends on unsafe drinking water supplies impacted by fecal

contamination (Onda, LoBuglio, & Bartram, 2012; WHO/UNICEF Joint Monitoring Programme, 2017). Consumption of unsafe water is responsible for over 500,000 deaths annually due to diarrheal disease (Prüss-Ustün et al., 2014).

Countries in sub-Saharan Africa have particularly low levels of access to safe drinking water. Kenya is representative of trends region-wide, with 74% of the population residing in rural areas and only about half of rural households identifying an improved water point as their main drinking source (WHO/UNICEF Joint Monitoring Programme, 2015). Access in urban areas of Kenya is better at 85%, but rapid population growth – especially in slums – due to rural-urban migration is placing intense pressure on existing water infrastructure. For example, informal settlements surrounding Nairobi constitute just 6% of the total residential land area, yet are home to 60% of the city's total population (U.N. HABITAT, 2014). As a consequence, unsafe water consumption is still among the three leading risk factors for premature death and the most significant environmental risk factor in sub-Saharan Africa (GBD 2015 Risk Factors Collaborators, 2016).

In the coming years, governments will face challenges of poor quality and inequitable distribution through their commitment to the Sustainable Development Goals (SDGs). SDG Target 6.1 aims to deliver universal and equitable access to safe and affordable drinking water for all (United Nations, 2016). Initiatives under SDG 6.1 will expand access to piped supplies delivering water to the home or yard. However, in urban slums

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and dispersed rural communities, delivering piped water to dwellings is unlikely to be feasible in the near term. A study in Kisumu, Kenya, for example, revealed that over 90% of the city's residents relies on non-piped drinking water sources (Sima, Kelner-Levine, Eckelman, McCarty, & Elimelech, 2013). Across rural Kenya, access to piped water on premises is equally low (14% of households) and has remained stagnant over the past decade (WHO/UNICEF Joint Monitoring Programme, 2015).

In these settings, safe water kiosks offer a promising solution for providing safe drinking water to those most in need (Opryszko et al., 2013; Sima, Desai, McCarty, & Elimelech, 2012). Safe water kiosks (hereafter referred to as kiosks) are community-scale decentralized water treatment and selling points that operate in parallel to governmental water infrastructure (Sima & Elimelech, 2013). While kiosks are increasingly used in urban areas (Sima & Elimelech, 2013; Sima et al., 2013), in rural settings adoption rates are often low and use is predominantly irregular (Opryszko et al., 2013; Sima & Elimelech, 2013). Initial evidence from Kenya shows that irregular kiosk use is partly caused by seasonal source switching to rainwater harvesting (Contzen, 2018).

From a short-term individual perspective, seasonal switching is highly beneficial. First, rainwater harvesting, which is usually conducted in a household's compound, reduces time spent fetching water by drastically reducing walking time and eliminating queuing time. Second, rainwater harvesting, aside from initial investments into the infrastructure, is free, thereby reducing the household's total water expenditures. From a long-term collective perspective, however, seasonal switching is counter-productive to well-being: if many people use the kiosk irregularly, the kiosk's operational viability is challenged and it might be forced to discontinue its service (Opryszko et al., 2013; Sima & Elimelech, 2013). The community would lose an important safe water source, potentially the only one available all year-round. In other words, seasonal switching presents a social dilemma (Brewer & Schneider, 1990). A key question with regard to social dilemmas is which factors encourage people to *cooperate*, that is to follow the long-term collective interest at cost of the short-term individual interest? More specifically, which factors foster regular kiosk use¹ at the cost of short-term benefits gained through seasonal switching? In the present study we examine *collective psychological ownership* (Pierce & Jussila, 2010) as a potential solution to the problem of irregular kiosk use.

1.1. Collective psychological ownership and water system sustainability

The ownership-concept originates from research in organizational psychology. Most relevant for the present study, this research revealed that employees felt ownership towards their job and the organization when they experienced control over their job because they had participated in decision-making (Pierce, O'Driscoll, & Coghlan, 2004). Such psychological ownership in turn has been found to be related to various factors determining organizational well-being, such as organizational citizenship behavior (OCB; O'Driscoll, Pierce, & Coghlan, 2006; Van Dyne & Pierce, 2004). OCB encompasses discretionary work behaviors that are not part of formal job descriptions and are performed by employees as a result of personal choice. Similar to regular kiosk use, OCB serves primarily long-term collective interests that contribute to overall organizational effectiveness, at cost of short-term individual interests as it is time-consuming and provides no direct individual return.

Marks and colleagues applied the concept of collective psychological ownership to the context of water infrastructure management in developing countries (Marks & Davis, 2012; Marks, Onda, & Davis, 2013). Through an investigation of 50 piped drinking water supplies in rural Kenya, collective sense of ownership for the system was found to arise from households' involvement in decisions regarding their system's

management, as well as non-token (> US \$50) upfront cash contributions toward its installation (Marks & Davis, 2012). In a follow-up study of system sustainability, water users' sense of ownership for their system was associated with collective confidence in its functionality and better management practices, whereas water committees' sense of ownership was associated with improved infrastructure condition (Marks et al., 2013). Taken together, these studies probed antecedents and consequences of collective sense of ownership, with a focus on whether water users' collective sense of ownership served as a mediating factor between different forms of participation in system planning/installation and subsequent system functionality. More generally, these studies extended and broadened the theory of collective psychological ownership to the context of community-level stewardship of a communal resource.

The present paper builds on and extends this line of research with regard to the use of water kiosks. In line with above, we hypothesize that community members' involvement in decision-making related to kiosks' maintenance and organization leads to collective sense of ownership for the kiosk (H1; Marks & Davis, 2012; Pierce & Jussila, 2010; cf. Fig. 1). Collective sense of ownership, in turn, is expected to lead to regular kiosk use (H2). In addition, we investigate *why* collective sense of ownership might increase regular kiosk use. We outline the potential underlying mechanisms of the ownership-use relation as follows (see Fig. 1).

1.2. Underlying mechanisms of the ownership-use relation

Previous research has shown that people who own an object evaluate it more favorably than non-owners, probably because the possession is seen as an extension of the self (Beggan, 1992). In line with this 'mere ownership effect', we expect that the more one senses to own the kiosk, the more positive one's attitudes towards the kiosk and its use will be, such as good perceived water quality and low perceived effortfulness to use the kiosk (cf. Van Dyne & Pierce, 2004).

Further, it can be assumed that one owns an object not only for the sake of ownership but also (or even more so) for the sake of using it. Accordingly, we expect that owning the kiosk *collectively* creates an environment of mutually expected use with each co-owner being expected and expecting others to use their shared property. In other words, the more a person senses to own the kiosk collectively, the more s/he assumes others (i.e. her/his co-owners) expect and approve of her/him using the kiosk, which is in line with the concept of injunctive norm (Cialdini, Kallgren, & Reno, 1991). Further, the more a person senses to own the kiosk *collectively*, the more the person expects that others (i.e. co-owners) use the kiosk, which is in line with the concept of descriptive norm (Cialdini et al., 1991). To sum up, collective sense of ownership is expected to be associated with injunctive and descriptive norms, in short, with social norms.

Next, it has been proposed that feelings of ownership towards the organization increases the level of effort invested into and personal sacrifices made for the organization (Pierce & Jussila, 2010). Similarly, we expect that the more one senses to own the kiosk, the more one invests effort into and makes personal sacrifices for the kiosk, including to keep the kiosk running through regular use. Investment of effort and personal sacrifices may include adjusting one's daily routine to the kiosk's often short and unreliable opening hours or to spending time queuing. As a result of the investment of effort and personal sacrifices, one should succeed more often in attempts to use the kiosk, that is experience mastery, which in turn should increase perceived self-efficacy (defined as belief in one's capability to use the kiosk) since mastery experience is a key source of self-efficacy (Bandura, 1998). We assume that self-efficacy is further increased through low perceived effortfulness; the less effortful (i.e. the easier) one perceives kiosk use to be, the higher one's perceived self-efficacy should be.

Building on the theory of planned behavior (TPB; Ajzen, 1991), we assume that the more positive one's attitudes towards the kiosk and its use are, the more motivated and *committed* (a concept paralleling intention; Tobias, 2009) one will be to use the kiosk; 'what I like, I want

¹ In contrast to social dilemma situations in which *reduced resource use* is needed to preserve the communal resource, in the present case *regular resource use* represents a contribution to the collective to help to preserve the communal resource.

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