

# It's mine, so I am taking care of it!

## Psychological ownership for sustainable health-related infrastructure

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### I. Background

- Millions of people drink unsafe water, e.g. arsenic contaminated water. They are at risk from severe health effects: skin lesions, cardiovascular diseases, cancer, social & mental health effects (Brinkel, Khan, & Kraemer, 2009)



Fig. 1a. Skin lesions. Left: change in colour and structure of skin on hands. Middle: change in thickness of skin on palm and on sole of feet. Right: black spots on the back.

- SDG 6.1 aims at providing safe and affordable drinking water for all.
- In Bihar, community-based arsenic filtration units with piped water distribution are installed by the Public Health and Engineering Department of the State of Bihar:



Fig. 1b. Community-based water scheme. Left: Pump & Filtration house. Middle: Arsenic filtration unit in the Filtration house. Right: Public collection tap of the piped water distribution scheme.

- However, new safe water infrastructure is often not maintained or used in the long-term (Kabir, & Howard, 2007).
- Previous studies suggested psychological ownership to be important for sustainability (Marks, Onda, & Davis, 2013) and regular use (Contzen, & Marks, 2018) of water-schemes.
- Little is known about the concept of psychological ownership, how it emerges (routes) and its consequences in the context of health related infrastructure.

### II. Psychological Ownership

- Psychological Ownership is the state wherein a person feels as though an object is his or hers *without* necessarily owning it legally (Pierce, Kostova, & Dirks, 2003).
- Three routes are proposed (Pierce et al., 2003), how the state emerges:

#### Self-Investment

Item 01: My family invested labour in the water scheme.  
Item 02: Without my contribution, the water scheme would not exist.

#### Having Control

Item 01: I have control over the water scheme.  
Item 02: I feel like it is in my hand who can use the water system and who can not.

#### Intimate Knowledge

Item 01: I know who is responsible for the water scheme if there are any troubles.  
Item 02: I am familiar with the purpose of this water scheme.

#### Psychological Ownership

Item 01: I feel a very high degree of personal ownership for this water scheme.  
Item 02: I sense that this is my water scheme.

Fig. 2. Self-investment, control, and intimate knowledge regarding the target are the three routes to psychological ownership assumed by Pierce et al. (2003). Item 01 and Item 02 are two examples of our items how to measure the concepts. Answers are possible on a 5-point Likert-scale from 1 = I do not agree at all to 5 = I totally agree.

#### RESEARCH QUESTIONS

- How is psychological ownership understood in the water context?
- What are routes and consequences of psychological ownership for safe water systems?

### IV. Conceptualisation of Psychological Ownership

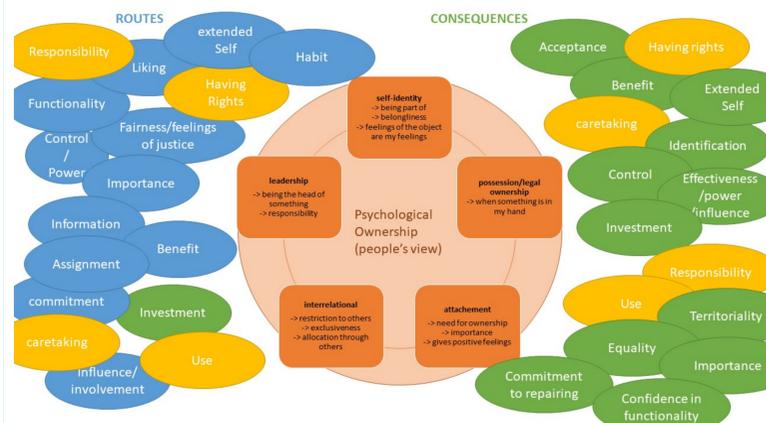


Fig. 5. Conceptualisation of psychological ownership (orange), routes to psychological ownership (blue, mostly mentioned = yellow) and consequences of psychological ownership (green, mostly mentioned = yellow) according to the view of people in Bihar. The proposed routes of Pierce et al. (2003) appear, but as well as consequences. Generally, routes and consequences did not clearly seem distinguishable.

#### Content Analysis of Qualitative Interview Data

- Persons in Bihar perceive psychological ownership as a multi-faceted construct.
- Psychological ownership can be triggered by one of the routes mentioned. And it has important consequences.
- Routes to and consequences of psychological ownership are not per se different from each other.
- For the water scheme, Biharis perceive especially the functionality as a route to psychological ownership.
- Users lack access, perceive collective ownership & report low maintenance in non-functional schemes:
  - Restricted access  
e.g. "We are not allowed to use the community-owned filter."
  - Collective ownership  
e.g. "We all use the filter and that is why we have the feeling to collectively own the filter."
  - Low maintenance of infrastructure  
e.g. "He is not fulfilling his duties (e.g. reparations) makes us personally feeling sad."

### III. Methods

#### Mixed-Methods-Approach:

- Qualitative interviews (N=17)
- Quantitative cross sectional survey (N=328)

#### Data Analysis

##### Qualitative Data

- Content analysis (Mayring, 2004) to conceptualise psychological ownership and to develop the questionnaire for cross-sectional survey

##### Quantitative Data Analysis:

- Multiple Imputations (n=5) to impute missing data
- Multiple linear regressions for routes
- Singular linear/logistic regressions for consequences



Fig. 3. Face-to-face interview, Japteli (Bihar, India).

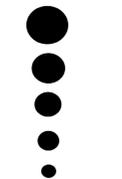


Fig. 4. Visual answer scale for 5-step Likert scale coded questions.

#### Data collection

- Bhagalpur (Bihar, India)
- Face-to-face interviews with users, non-users and caretakers of functional and non-functional water systems
- Structured questionnaire with users & non-users in functional water systems
- Visual answering scale

### V. Routes & Consequences of Psychological Ownership

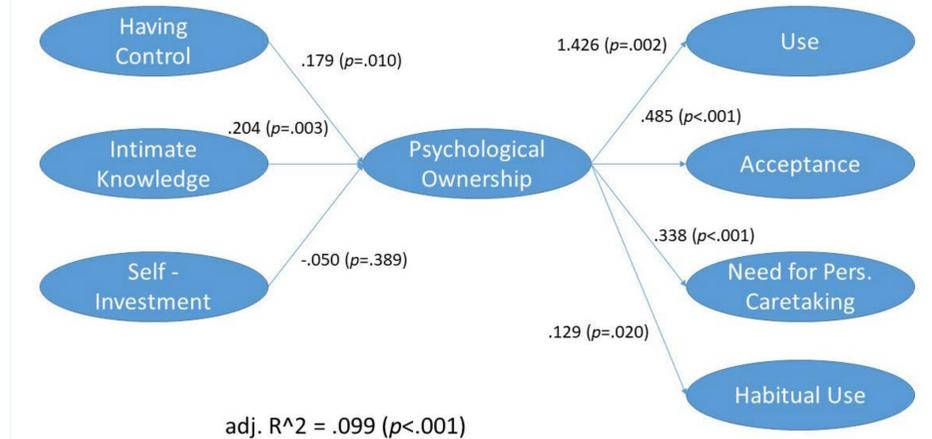


Fig. 6. A summary of multiple linear regressions and a logistic regression (use=1, non-use=0). Sample size is N = 328. Having control and intimate knowledge significantly related to psychological ownership. Self-Investment did not. Psychological ownership was related to the use of the water scheme, its acceptance as ones own water scheme, the perceived need to taking care of the water scheme and the habitual use of the water scheme.

- Having control over and intimately knowing the water scheme is associated with a significantly greater psychological ownership over the target.
- Persons with one unit higher psychological ownership are 1.426x more likely to use the water scheme, compared to those with one unit lower.
- Psychological Ownership is significantly related to bigger acceptance, higher willingness for caretaking and more habitual use of the water scheme

Scale	# Items	M	SD	Cronbach α	Item (e.g.)
Having Control	10	2.40	0.83	0.73	I cannot influence what happens with the water scheme.
Intimate Knowledge	5	2.37	0.95	0.67	I know who is responsible for the water scheme if there are any troubles.
Self-Investment	3	1.90	1.18	0.60	Without my contribution, the water scheme would not exist.
Psychological Ownership	5	3.27	1.02	0.83	I sense that this is my water scheme.
Use	1	-	-	-	Are you user or non-user of the community water-scheme?
Acceptance	1	3.05	1.41	-	I accept the water scheme as my water scheme.
Need for Personal Caretaking	1	3.08	1.51	-	I feel the duty to personally take care of the water system.
Habitual Use	12	2.84	1.05	0.90	Collecting water for drinking and cooking purpose at the water system is something I do without having to remember actively.

Table 1. Key descriptive statistics for scales. If Cronbachs α is < 0.7, we decided depending on the content of an item whether to use the scale or not. In the right column, an item of every scale is shown. Answers to the items are possible on a 5-point Likert-scale from 1 = I do not agree at all to 5 = I totally agree, except for "use", which is a dichotomous item (1 = User, 0 = Non-user). Psychological Ownership is a shortened scale of Van Dyne, & Pierce (2004) and Habitual Use is the Self-Reported Habit Index (SRHI) by Verplanken, & Orbell (2003).

### VI. Conclusions

- In line with psychological ownership theory, greater intimate knowledge and control (but not self-investment; potentially due to a floor effect) were related to greater psychological ownership for the safe water source.
- The concept of psychological ownership is understood and can be measured in India.
- Use of safe water sources and possibly other health-related infrastructure is related to peoples feeling of how much it is theirs.
- Theory of psychological ownership can contribute to the understanding of these mechanisms and potentially guide intervention development.

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### VII. Further research

- Results from the qualitative study suggest further routes to psychological ownership that may increase the explained variance.
- We are currently developing interventions targeting the routes to psychological ownership as a concept specifically for health-related infrastructure.
- Trial to experimentally manipulate the routes to psychological ownership for improved use and functionality of safe water sources

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