



Delft University of Technology

Psychology

The missing link in transitions research

de Vries, Gerdien; Biely, Katharina; Chappin, Emile

DOI

[10.1016/j.eist.2021.09.015](https://doi.org/10.1016/j.eist.2021.09.015)

Publication date

2021

Document Version

Final published version

Published in

Environmental Innovation and Societal Transitions

Citation (APA)

de Vries, G., Biely, K., & Chappin, E. (2021). Psychology: The missing link in transitions research. *Environmental Innovation and Societal Transitions*, 41, 42-44. <https://doi.org/10.1016/j.eist.2021.09.015>

Important note

To cite this publication, please use the final published version (if applicable). Please check the document version above.

Copyright

Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy

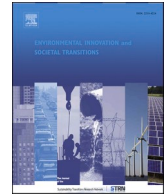
Please contact us and provide details if you believe this document breaches copyrights. We will remove access to the work immediately and investigate your claim.



ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Environmental Innovation and Societal Transitions

journal homepage: www.elsevier.com/locate/eist

Psychology: The missing link in transitions research

Gerdien de Vries^{*}, Katharina Biely, Emile Chappin

Delft University of Technology, Faculty of Technology, Policy and Management – TPM Energy Transition Lab, P.O. Box 5015, 2600 GA, Delft, Netherlands

A B S T R A C T

In the next decade, transition researchers need to embrace perspectives, theories, and methods from the scientific field of psychology. An integrative research approach that covers the individual, group, and system level, executed in interdisciplinary research teams is necessary for more effective analysis and applications of sustainability transition processes.

1. Transitions and psychology

Transitions are very complex, their trajectories are deeply uncertain and they require all actors involved to change their behaviour. Behaviour can be defined as “... activities in response to external or internal stimuli, including objectively observable activities, introspectively observable activities, and nonconscious processes.” (American Psychological Association 2021a; 2021b). In energy transitions, for example, citizens and organisations need to accept new infrastructure systems, and policymakers have to design policies that push for technological, system, and social innovations.

It is extremely challenging, though, to accomplish behavioural change in transitions. The underlying processes are difficult to identify and vary widely, which is reflected in the various scientific disciplines active in this domain. Prominent examples include behavioural economics investigating how people make economic choices adhering to concepts like utility, aversions, and preferences (e.g. Cialdini, 2018), and sociology providing the societal context where behaviour is routinized (i.e., Social Practice Theory, Reckwitz, 2002). A scientific field that can bring these approaches together is psychology. Psychologists from several subfields – including social and cognitive psychology – explore, test, and analyse the biological, cognitive, emotional, personal, and social processes or stimuli underlying human behaviour (American Psychological Association 2021b).

In this paper, we claim that psychology is needed to analyse the processes underlying behaviour change in sustainable transitions and to design policy tools to interact with them. More specifically, psychology can (1) improve the scientific understanding of the behavioural structures of decision-makers, and thus (2) increase the effectiveness of decision-making processes and interventions that seek to support behavioural change. Furthermore, (3) psychology facilitates formalization and modelling of decision-making processes, for example for informed policy analysis and policymaking.

Stakeholders dealing with behaviour in sustainability transitions value the insights provided by psychology (e.g., Williamson et al., 2018); an appreciation visible in the emergence of behavioural units in public and private organisations. However, perspectives on the relation between psychology and the broader system are underdeveloped in general which could be detrimental for sustainability transitions.

^{*} Corresponding author.

E-mail address: g.devries-2@tudelft.nl (G. de Vries).

<https://doi.org/10.1016/j.eist.2021.09.015>

Received 21 April 2021; Received in revised form 14 September 2021; Accepted 30 September 2021

Available online 19 October 2021

2210-4224/© 2021 The Authors.

Published by Elsevier B.V. This is an open access article under the CC BY license

(<http://creativecommons.org/licenses/by/4.0/>).

2. Integrated research approach

To better understand and study actor behaviour in transitions, transition research needs to integrate psychological perspectives, theories, and methods. Below, we will explain why and how.

2.1. Perspectives

System and transition researchers traditionally focus on the collective agency (group-level behaviour) or the system-level behaviour emerging from many lower-level events (e.g. [Ackoff, 1971](#)). Psychologists tend to focus on individual and group-level behaviour. An integrated research approach with all three levels of analysis - individual, groups, and the system - can enrich research, models, and policies on behaviour change (e.g., [Bögel and Upham, 2018](#)). By going back and forth between a zoomed-out perspective on the societal issues and a zoomed-in perspective on the behaviour and interactions of stakeholders (e.g., [Bujold et al., 2020](#)) such an integrated approach can be used to find explanations for behavioural processes while acknowledging that they are rooted in large-scale socio-technical systems ([Hughes, 1987](#)), including their political, (socio)-economic, institutional, and technological characteristics, and rich context (e.g., [Nielsen et al., 2021](#)).

2.2. Theory

System researchers in the technology and infrastructure domains in particular call for formalized psychological theories to better understand and study actor behaviour ([Squazzoni et al., 2020](#)). These psychological theories are useful when fully integrated with theories capturing the larger context in which the behaviour takes place (e.g., [de Vries, 2020](#)). For example, theories on technology acceptance, social norms, and behavioural intention can improve models on the adoption decisions and use patterns of residential heat pumps, while theory on the regulation of the infrastructure and the organization of the heating market is required to provide the necessary conditions for those modelled decisions.

An integrated model that includes these theories is beneficial for policy-making because it covers technology, design, availability, prices of, and rules governing a specific technology, the infrastructures that permit and support correct use, and psychological drivers and barriers regarding perception and technology uptake (or rejection).

2.3. Research methods

Traditional psychology methods with a focus on isolated and static factors, including questionnaires and (lab) experiments, are insufficient to grasp the global complexity and dynamics of sustainability transitions (e.g., [Bögel and Upham, 2018](#)). A mix of quantitative and qualitative research methods, however, that captures the behaviours of multiple actors on different levels of analysis is useful.

[Table 1](#) shows examples of research methodology on the various levels (system, group, individual), from which selections can be mixed in itinerary processes; in this case for residential heating transitions.

3. Challenges

In sum, an integrative research approach is needed to capture, predict, and influence behaviour in transition processes. Psychology is indispensable for this. However, integrating psychology in transition research comes with challenges. First, the research paradigms differ: transition researchers tend to practice an interpretative, holistic style and psychologists an empirical, positivistic style. This makes it difficult to design research. Second, there are traditionally different views on the construct of behaviour, which makes it a challenge to select and merge the most appropriate theories. A third challenge is to capture irrational human behaviour in computational transition models. Transition researchers might be interested in modelling general behaviour patterns and psychologists in

Table 1

Integrated research approach on behaviour in transitions on the system, group, and individual level.

Level	Examples of research methodology	Examples of research methodology in heating transitions
System	Observation of behaviour in society	Gas phase-out transition goals are not met. Heat pump adoption rates are low.
System	Model simulation of interventions	Simulate the system-level outcome of individual actor behaviour under hypothetical conditions, including possible interventions.
System	Field testing and monitoring interventions	Interventions are implemented and monitored. The adoption of heat pumps is measured.
Group	Design and experimental testing of interventions	Compare services and policies that affect hassle, the conservativeness of installers, and align the decision-making processes of policymakers. Pick best practice.
Individual	Analysis of behaviours – and their underlying psychological mechanisms - within a theoretical framework	Hassle is a barrier for homeowners to adopt. Installers give conservative advice. Policymakers' decisions on the national and local levels are not aligned.
Individual	Empirical assessment and formalization of mechanisms that drive behaviour	Large-scale questionnaires and expert interviews. Draft of a formalized model.

individualistic differences and exceptions. Agreement is needed to translate models into effective (mass) policies.

These challenges call for team science and truly interdisciplinary research teams that are flexible and willing to compromise to deal with the tension between fundamental and applied research, have open conversations and are not afraid for confrontations. A new shared language can support this: an unequivocal language on multi-actor behaviour of systems in transition that is understood and mastered by researchers and practitioners from different backgrounds and disciplines. With this paper, we invite you to develop this language with us: who joins us?

Declaration of Competing Interest

None.

References

- Ackoff, R.L., 1971. Towards a system of systems concepts. *Manag. Sci.* 17 (11), 661–671.
- American Psychological Association (2021a). Retrieved September 7, 2021 from <https://dictionary.apa.org/behavior>.
- American Psychological Association (2021b). Retrieved September 7, 2021 from <https://dictionary.apa.org/psychology>.
- Bögel, P.M., Upham, P., 2018. Role of psychology in sociotechnical transitions studies: review in relation to consumption and technology acceptance. *Environ. Innov. Soc. Transit.* 28, 122–136.
- Bujold, P.M., K. Williamson and E. Thulin (2020). *The science of changing behavior for environmental outcomes: a literature review*. Rare Center for Behavior & the Environment and the Scientific and Technical Advisory Panel to the Global Environment Facility.
- Cialdini, R.B. (Ed.), 2018. Why the world is turning to behavioral science. In A. Samson (Ed.), *The Behavioral Economics Guide 2018 (with an Introduction By Robert Cialdini)*(pp. VII-XIII).<https://www.behavioraleconomics.com/the-behavioral-economics-guide-2018/>.
- de Vries, G., 2020. Public communication as a tool to implement environmental policies. *Soc. Issues Policy Rev.* 14, 244–272.
- Hughes, T.P., 1987. The evolution of large technological systems. In: Bijker, W.E., Hughes, T.P., Pinch, T.J. (Eds.), *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*. MIT Press, Cambridge, Mass, pp. 51–82, 2, 13, 18.
- Nielsen, K.S., Clayton, S., Stern, P.C., Dietz, T., Capstick, S., Whitmarsh, L., 2021. How psychology can help limit climate change. *Am. Psychol.* 76, 130–144.
- Reckwitz, A., 2002. Toward a theory of social practices: a development in culturalist theorizing. *Eur. J. Soc. Theory* 5, 243–263.
- Squazzoni, F., Polhill, J.G., Edmonds, B., Ahrweiler, P., Antosz, P., Scholz, G., Chappin, É., Gilbert, N., 2020. Computational models that matter during a global pandemic outbreak: a call to action. *J. Artif. Soc. Soc. Simul.* 23 (2), 10.
- Williamson, K., Satre-Meloy, A., Velasco, K., & Green, K. (2018). Climate Change Needs Behaviour Change: making the Case for Behavioral Solutions to Reduce Global Warming. RARE.