Active agents of sustainability transitions

transitions. We have studied the life courses of agents in a specific setting: sustainability transitions of the socio-technical system. The connection between agency and sustainability transitions was necessary to determine in order to (1) understand the context in which agency formation is explored and (2) find relevant agents for our empirical part of the study.

Second, the essence of agency and its relation to the larger environment are also crucial to determine in order to understand how individuals try to shape their surroundings. Our final theoretical component was life course research, which we selected because such research is widely used to interpret individuals' paths and to

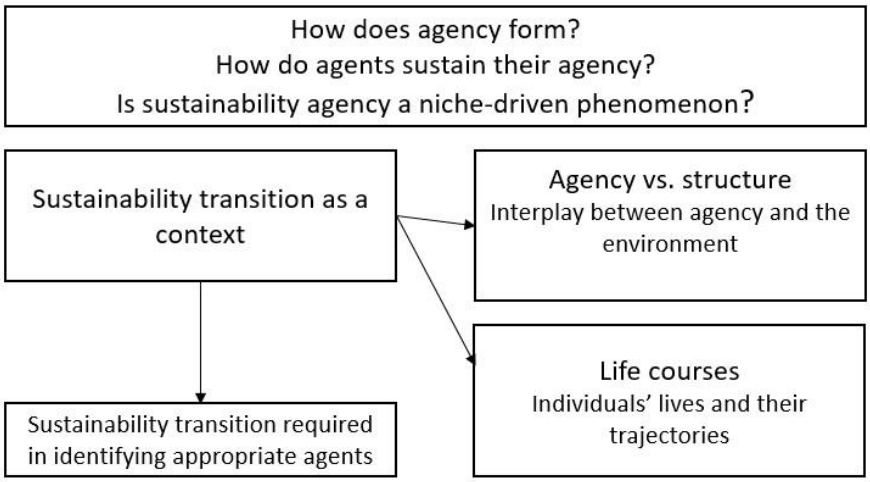

Figure 1. Theoretical components adopted in relation to our research questions

2.1. Sustainability transition in relation to agency

We have studied agency from a multi-level perspective (MLP) framework, mentioned earlier, which was initially elaborated on by Geels [10]; the framework is currently prominent within the discipline. The popularity of the framework is largely explained by the fact that the MLP aims to bring together the technical and social aspects of sustainability transitions. Whereas single technologies such as wind turbines or biofuels previously dominated the literature on environmental innovation, the MLP draws a more explicit picture of transition processes, including social and governmental dimensions in transition [1]. In the MLP, transitions are perceived as complex, long-term processes involving multiple actors [1, 10, 11]. The research on sustainability transitions attempts to answer the question of how niche innovations emerge and how those innovations then challenge, replace, transform, and eventually reconfigure existing typically unsustainable technologies and systems [1].

How agency is situated in the context of socio-technical transition has been the subject of much debate in recent years. Whereas agency has always been an integral part of the MLP [1, 11, 12], the essence of agency has still been a controversial subject within the discipline. The debate in the literature has typically focused on the question of whether agency can influence the prevailing system [13]. Several scholars have concluded that agency is a crucial component of sustainability transitions [3, 14, 15]. The importance of agency is explained by the fact that agents are capable of shaping the current regime. The MLP also includes the vested idea that agents are able to introduce transitions outside the existing regime. Geels [11] has stated that agents are an

essential factor, since sustainability transitions do not occur without the actions and interactions of a broad range of actors and social groups. In particular, various studies have found that discursive activities at the regime and niche levels eventually lead to landscape level [1, 16, 17].

Agency is critical, since agents possess the abilities, means, and power for deliberate action, all of which can result in more sustainable societies [15]. Agency also influences the internal configuration of sustainability as well as individual agency enables people to further embed sustainability beyond themselves [18, 19]. Recent studies have suggested that by empowering ordinary people and communities, agency may become one of the most effective ways of creating sustainable futures [20, 21]. Grin et al. [3] have argued that a successful sustainability transition ultimately depends on agency in niche-level innovations that implement regime-level changes and connect the niche and regime levels.

Several scholars, however, have stated that agency generally tends to be underrated in the multi-level perspective [7, 22, 8, 23]. Agency also tends to be a somewhat neglected subject within the transition-management discipline. Rotmans et al. [24] have included agency within transition management through backcasting, although both transition management and backcasting typically only involve certain types of agents, which leaves room for several other representations of agents, especially at the local level [25, 26, 27]. One of the largest theoretical debates within the transition discipline is thus currently concentrated on the question of how to explicitly conceptualize and integrate actors and agency into the study of socio-technical transitions [28].

In addition to the general downplay of agency within the MLP, the portrayal of agency also remains fairly narrow. Whereas past research has acknowledged agents as components who have the potential to shape the status quo and to enable sustainability transitions, the literature typically sees agents from an outcome perspective, rather than from a motivation or power perspective [9]. The existing knowledge of agency is still relatively narrow and functionalist, since the individual rationales, aspirations, and formation processes remain under-researched [9]. The current research has also not yet acknowledged the life courses of agents [9]. An appreciation of agency within the sustainability-transition literature appears to be in the process of emerging; while the holistic view of agency is now emerging throughout the discipline, the rationales of agents and how agency forms and is sustained still remain under-researched.

2.2. The interplay between agents and their environments

The term ³DJHQF\´ is a central concept in the social relation to the larger environment (or structure) is a widely discussed topic in sociology, in which agency is often interpreted as the human capability of making choices and of having an impact RQ RQH¶V HQYLURQPHQW > @ :KLOH RWKHU H[LVWLQJ well [e.g., 31, 32], in this paper, agency is studied and defined using the explanation from Anthony Giddens and Margaret Archer, influential sociologists whose theorizing has shaped the contemporary debate on agency. Structuration theory is an applied theory to explain the interplay between agents and structure, although the theory has been criticized for neglecting situated details, especially the psychological dimensions of agents (such as motivation and SHUFHSWLRQV DQG DJHQWV¶ FRQWH[WV > @ 7KH ³VWUR SDUWLFXODU WR FRQVLGHU DJHQWV¶ organizational and wider structural change [33]. Hence, the strong structuration framework is more relevant in this paper; after briefly describing structuration theory, we will return to the strong structuration framework.

The interplay between individuals and their environments is a crucial part of structuration theory, which Giddens initially formulated [29]. In structuration theory, agency is understood as the bidirectional movement between individuals and their environments [34]. Giddens underlined how agency and structures are ultimately inseparable [29]. Agency determines structure, which consequently determines the opportunities for the expression of agency [29]. This means that, from a structuration perspective, social structures exist and function through agents, actions, and assign specific roles and meanings for those structures [35]. Following Giddens, Archer [30] expanded the debate on structure and agency by elaborating on structure and agency as existing not as a dichotomy but as two separate functions in constant movement [30]: agency constantly affects structure, yet agency is also constantly affected by structure [30].

Archer's and Giddens's work [33] in particular has developed Giddens's work into what is now known as structuration theory. Whereas Giddens was especially interested in relatively abstract ontology, Stones moved forward and encouraged researchers to explore empirical case studies of the duality of agents and structures, where individual agents are situated in a web of pre-existing relations [36]. Although the duality of structure—meaning that agency and structure are inseparable and exist only in duality—remains a defining construct in strong structuration theory, Stones states that the duality is best understood through the analysis of a quadripartite framework of interrelated components, including external structures, internal structures, active agency, and outcomes [36], in which external structures obligate the actions of agents; internal psychological structures are found within agents; active, intentional agency is assumed; and outcomes occur that are internal and/or external to the agent [33, 37, 38, 39, 40]. Within this paper, we study the life courses of agents in the context of sustainability transitions, and more precisely within the framework of the multi-level perspective. The MLP, which refers to a wider structure with three different levels of socio-technical structuration, provides an illustration for the external structures of the strong structuration framework.

Stones [33] explains the four elements in this way: external structures are separate from the agent and the "world" beyond the agent's immediate framework. These boundaries include, for example, laws, policies, and organizations. Internal structures include two categories: first, those that are generally dispositional, such as norms, values, and attitudes in relation to one's daily life; and second, those that are more conjunctural, such as the agent's knowledge and understanding of their immediate and wider context. Whereas these two categories are fundamentally distinct, in practice they may overlap [40].

Within this framework, active agency relates to processes of deliberate, sometimes strategic, action [41]. In this paper, active agency includes proactive steps that are taken toward sustainability, both in agents' personal and professional lives, for example, among sustainability professionals or entrepreneurs or as resistance to the existing system. In the end, outcomes are any possible consequence of the previous actions for the agents and their structural context [33]. Outcomes, as we will show, can be positive or negative pathways and the possible tensions that these pathways entail. Strong structuration is often applied to understand the connections between individual action and organizational processes and outcomes [37, 40]. Strong structuration is generally understood as a conceptual methodology that acts as a bridge between theory and empirical research [42, 36]. Hence, we apply strong structuration in the framework of the MLP to our case, as we will show in the next section.

2.3. Life courses

Life course research is a widely used method for the study of individual lives and their W U D M H F W R U L H V 5 H V H D U F K R Q O L I H F R X U V H V H [D P L Q H V L historical and biographical perspectives [43]. A life course perspective is built on the assumption that experiences at every level of life inform our experiences at subsequent stages in our lives as part of an overall trajectory that eventually demonstrates the evolution of life experience over time [44]. In addition to examining individual life paths, life course research also covers the L Q W H U G H S H Q G H Q F H R I S H R S O H ¶ V O L Y H V L Q U H O D W L R Q D O ways in which individuals share their life experiences through their closeness with one another > @ 0 L W F K H O O > @ S I R U H [D P S O H K D V G H I L Q H G D O H Y H Q W V D Q G U R O H V W K D W W K H L Q G L Y L G X D O H Q D F W V R Y H U proceed in a given sequence, but rather constitute the sum total of a life. Because it is possible to perceive crucial inside information from individuals through their life courses, such courses hold a significant position in the process of creating maps from individuals' meaningful life events that have an effect on their behavior. Doing so consequently helps to X Q G H U V W D Q G D J H Q F \ I R U P D W L R Q D Q G D F W R U V ¶ L Q W H U H V W 7 K H I R F X V R I O L I H F R X U V H U H V H D U F K L V R Q P D S S L Q J D J H Q W ¶ V events. Life course research puts forth the idea that the consequences of life events are likely L Q I O X H Q F H G E \ W K H H Y H Q W V ¶ W L P L Q J S H U F H L Y H G U H O H Y fundamental feature of the life course framework is to focus on the relation between life courses D Q G W K H V R F L D O H Q Y L U R Q P H Q W V D Q G H [S H U L H Q F H V R I W K it is crucial to acknowledge the narrative descriptions of events in the context of an agent's life in addition to having a scalar assessment of his or her life events [50]. By integrating a narrative S H U V S H F W L Y H Z L W K W K H S H U V R Q D O O L I H F R X U V H Q D U U D W L R I D Q D J H Q W ¶ V O L I H F R X U V H > urses allows for the creation of lifelines X G \ R I R U W L P H O L Q H V E \ X V L Q J T X D O L W D W L Y H Q D U U D W L Y H V D E R X O L Y H V > @ : L W K L Q W K L V S D S H U ³ Q D U U D W L Y H V ´ U H I H U W R surrounding these events' occurrence > @ , W L always include in addition to the position, the action, and the outcome of a narrative L Q G L Y L G X D O V ¶ R Z Q L Q W H U S U H W D W L R Q V necessary to remember D Q G L that, although the lifelines that are gathered from agents may seem linear, in reality the seemingly linear continuum is likely a set of discontinuous events that have been assembled together.

Regarding the positioning of agency within W K H O D U J H U H Q Y L U R Q P H Q W G X U % • K O P D Q Q D Q G / H Y \ ¶ V > @ D U J X P H Q W W K D W O L I H F R X U V H V gained in prominence in recent years. In other words, agents use their free will to steer their life course. But it is important to acknowledge, on the level of actual behavior, the difference between free- Z L O O H G D J H Q W L F L Q I O X H Q F H R Q R Q H ¶ V R Z Q O L I H F R X U V institutional, or environmental, influences [49]. Hence it is crucial to understand the variety of G L I I H U H Q W D J H Q W V L Q Y R O Y H G D Q G W R L P S O H P H Q W W K H O L courses and social constructions [49]. In terms of this paper, the life courses of agents provide the story behind the agency, and therefore the life courses also explain why the active agency of V X V W D L Q D E L O L W \ W U D Q V L W L R Q W D N H V V K D S H ([D P L Q L Q J helps to understand the interests of agents as well as clarifying the rationales for iterative sustainability action and the rationales for agents to stay engaged in sustainability transitions.

, Q G L Y L G X D O V ¶ L Q W H U H V W V K R Z H Y H U D U H F X U U H Q W O \ vested hypothesis about action; the hypothesis presupposes that agents are truly aware of their interests. Some sociologists have debated the concept of interest [57, 58]. In sociology, interests

are frequently seen instead as constructs, so interests are typically treated as an outcome rather than as sources of inspiration for action [59]. Geels [58] has argued that a rational calculation of effects of possible options might be useful in certain specific settings, but such estimates are less predictable in times of radical changes. Several sociologists have also stated, however, that interests are major driving forces for social behavior [59]. For example, Bakker [5] argues how interests matter in transitions and that these interests should not be undermined because, regardless of whether interests are real or mere constructs of the agents themselves, they do matter insofar as agents take these interests into account when making decisions about whether or not to engage in transition. In this paper, we assume that agents have several rationales for engaging in (and remaining engaged in) sustainability transitions. The rationales can be explained as being derived IURP WKH DJHQWV¶ LQWHUHVWV WKURXJK WKHLU OLIH FRX

In summary, within this paper we examine the agents of sustainability transitions. Our objective is to examine how agency forms and how agents sustain their agency; we also explore if sustainability agency is a niche-driven phenomenon. We aim to address these questions through DJHQWV¶ OLIH FRXUVHV DQG WKH and WaKeHir BuLildiHng RI sWtXrDuLcQtDuIres

3. Methods

Our data is derived from open interviews with active sustainability agents from the niche and regime levels in the existing socio-technical system. We applied a narrative methodology to find the meaningful eYHQWV GXULQJ DJHQWV¶ OLIH FRXUVHV WKDW KDG actions. In total, we conducted 16 interviews with active agents of sustainability transitions. We selected the respondents based first on initial desktop research and then on snowball sampling.

We aimed to find active agents of sustainability transitions who represented different roles and locations in the socio-technical system to unveil if their positioning in the system had influenced their agency and life courses. Our interviewees were selected based on their activity, but the actual setting, or environment, of the action could vary. For that reason, we selected agents from different fields [2] for example, from the energy sector and from the food system. Our interviewees represent the private, public, and third (i.e., voluntary or non-profit) sectors of Finnish society. Table 1 presents our interviewees in the two tentative agent categories of niche and regime agents; we have described the agents by categorizing niche actors in blue and regime agents in red.

7KH FDWHJRULHV ZHUH VHOHFWHG EDVHG RQ WKH DJHQWV relation to their lives. Based on our sample of agents, the majority of agents appeared to hold a sustainability-related degree. While we wanted to categorize our agents into groups to describe the agentic positions throughout the socio-technical system, we acknowledge that in reality, agents may have many ambivalent rationales, depending on their interests and different roles in life, all of which may mean that they fall into several categories rather than one single category. In addition, the dichotomy between niche and regime actors is somewhat crude, since agents may have several interactions between the niche and regime levels. For example, a regime representative may promote niche innovations deliberatively.

Table 1. Agent categories and their positioning in the socio-technical system

Category	Location in the MLP	N	Male [N]	Female [N]	Sustainability or environmental degree(s)

NGO actor	Niche	4	0	4	4
Sustainability professional i industry	Regime	4	1	3	2
Green consumer	Niche	2	2	0	0
Public actor	Regime	2	1	1	2
Academic	Regime	2	1	1	1
Entrepreneur	Niche	2	1	1	0
Total		16	6	10	9

We chose to conduct open interviews for our data collection, since such interviews give the respondents a voice and allow them to create narratives and talk freely about their lives, interests, rationales, and strategies related to sustainability actions [60]. Open interviews also allow flexibility to react to every individual interview setting accordingly. Our objective was to exploit T X D O L W D W L Y H Q D U U D W L Y H V U H J D U G L Q J L Q G L Y L G X D O V ¶ O L W L P H L Q L Q V L J K W V W K D W P D \ K D Y H U H V X O W H G L Q D J H Q F \ I R U P D W L R Q R U H [SODLQHG ZK\ WKH DJHQWV VWD\HG HQJDJHG LQ VXVWDLQDELOLW\ WUDQVLWLRQV :H UHFRUGHG DOO WKH LQWHUYLHZV ZKLFK ZHUH FRQGXFWHG LQ)LQQLVK DIWHUZDUG WKH LQWHUYLHZV ZHUH WUDQVFULEHG VR WKDW ZH FRXOG ODWHU UHWXUQ WR WKH WUDQVFULSWLRQV IRU RXU GDWD DQDO\VLV 7KH WUDQVODWLRQV RI WKH LQWHUYLHZ H[WUDFWV LQ WKLV SDSHU KDYH EHHQ VOLJKWO\ HGLWHG IRU FODULW\ LQ (QJOLVK DOWKRXJK WKH HGLWLQJ KDV QRW FKDQJHG WKHLU PHDQLQJ LQ DQ\ ZD\ 7KH GXUDWLRQ RI WKH LQWHUYLHZV YDULHG IURP PLQXWHV WR MXVW RYHU WZR KRXUV WKH WRWDO UHFRUGHG PDWHULDO DPRXQWHG WR KRXUV DQG PLQXWHV

The majority of our interviews were conducted in face-to-face conversations, but three interviews were conducted via Skype with video, and one was conducted via telephone. To ensure the anonymity of the interviewees and to stimulate openness during the interviews, the names of the individual respondents and their affiliations have been kept from this paper. We conducted all interviews in Finland between fall 2016 and fall 2017.

2 X U L Q W H U Y L H Z T X H V W L R Q V Z H U H J H Q H U D O O \ F R Q F H Q W U D W H G R Q W K H S U H V H Q W : H D V N H G D E R X W V H Y H U D O P D L Q W R S L F V L Q F O X G L Q J W K H G H Y H O R S P H Q W S D W K R I W K H L U D F W L R Q V W K H F U L W L F D O H Y H Q W V W K D W K D G O H G W R W K H L U G H O L E H U D W L Y H D F W L R Q V D Q G W K H L U O L I H F R X U V H V D Q G W K H L U D V V R F L D W H G Y D O X H V 7 K H L U Y L H Z V D O V R F R Y H U H G W K H L U D W W L W X G H V W R Z D U G V V R F L D O F K D Q J H D Q G W K H L U S R V L W L R Q L Q W K H P D W U L [V K R Z Q L Q)L J X U H

We designed the conversations with thematic questions with variations in specifying questions. Since the interviews were open format, some questions varied among different interviews, but all the central themes and questions were covered in every interview. More detailed interview themes and questions may be found in Appendix A. Since our objective was to find active agents of sustainability transitions, we also asked agents to position themselves in the matrix shown in Figure 2.

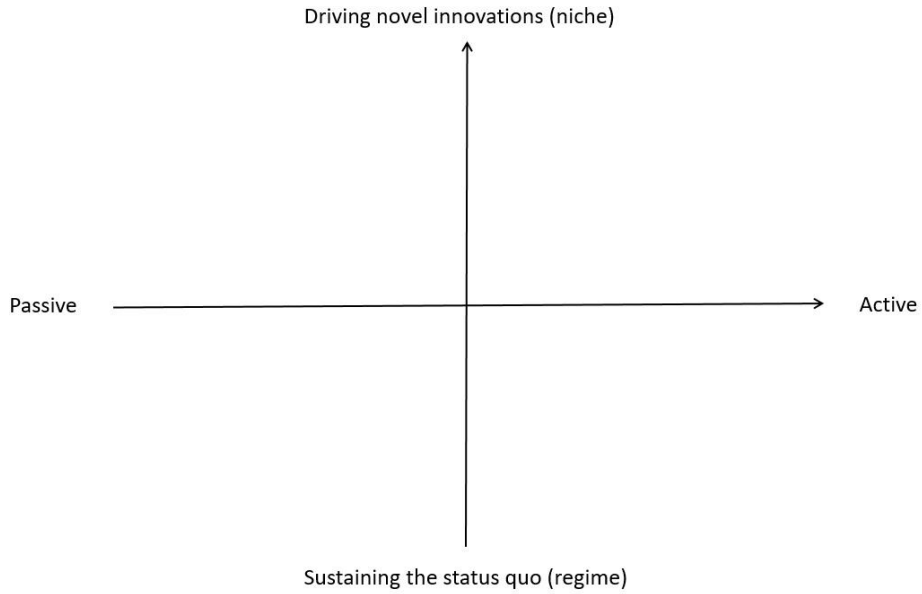

Figure 2. Agent matrix

: H DOVR H[DPLQHG DJHQWV¶ VWDQFHV WRZDUG WKH H[LV
agents who were active and willing to engage in sustainability transitions with the hope of shaping
the existing regime. In addition, our aim was to examine Jif HQWV¶ SRVLWLRQV ZLWK
WHFKQLFDO V\VWHP QLFKH RU UHJLPH LQIOXHQFHG WKHL
QRYHO LQQRYDWLRQV´ VHFWLRQ LQ)LJXUH GHVFULEHV D
ZKHUHDV WKH ³6XVWDLQLQJ WKH VWDWXV TXR´ VHFWLRQ DOOXVWUDWHV WKHLU
UHJLPH 7KLV GLVWLQFWLRQ LV DJDLQ UDWKHU FUXGH EX
about the existing system. We also acknowledge that the answers the actors provided wer
REWDLQHG ZLWKLQ D FHUWDLQ VHWWLQJ DQG LQGLYLGX
positions and opinions, which may differ from the objective reality. We still argue, however, that
open interviews with subjective narratives can provide insight into the process of interests
developing into deliberative actions.

For our data analysis, we followed the principles of grounded theory by using data comparison
and data reduction in order to create categories from our interviews and to move toward a m
conceptual direction [61, 62]. Our objective was to find a few aggregate levels from the data that
could provide more rigor in comparison to simply categorizing the data. We implemented our data
analysis in three main phases. Our aim was to analyze the data using the principles of grounded
theory [61] and then to continue by indicating aggregate levels from the data [62, 63]. We first
collected a set of narratives that described both agency LQ PDWLRQ SURFHVVHV DQG D
to remain resilient while engaging in sustainability transitions. Second, we identified integrative
themes that connected the first-level narratives. The main objective of the third phase was to
answer our research questions and to identify the conditions and triggers for the formation process
of agency and the rationales for remaining engaged within sustainability transitions. We also
explored whether agency was a niche-driven phenomenon. The aim of the third analysis phase was
to structure the data into more theoretical categories and to create aggregate dimensions [62, 63].

4. Who are the active agents of sustainability transitions?

7KH IROORZLQJ VHFWLRQ SUHVHQWV WKH DJHQWV¶ UHVS
and their positioning in the socio-technical system. We then found various explanatory factors in
the agency RU PDWLRQ SURFHVV DQG LQ WKH DFWRUV¶ DELOLWL
of sustainability transitions.

4.1. Where are the agents located in the system?

We created a collection fro P WKH DJHQWV¶ LQWHUYLHZV WR FK
sustainability and from their enthusiasm either to sustain or replace the existing system. Figure 3
VKRZV WKH DJHQWV¶ SRVLWLRQV 7KH EOXH GRWV UHIHU
WKH ³QLFKH´ JURXS ZKLOH DJHQWV ZKR DUH LQ WKH ³UHJL

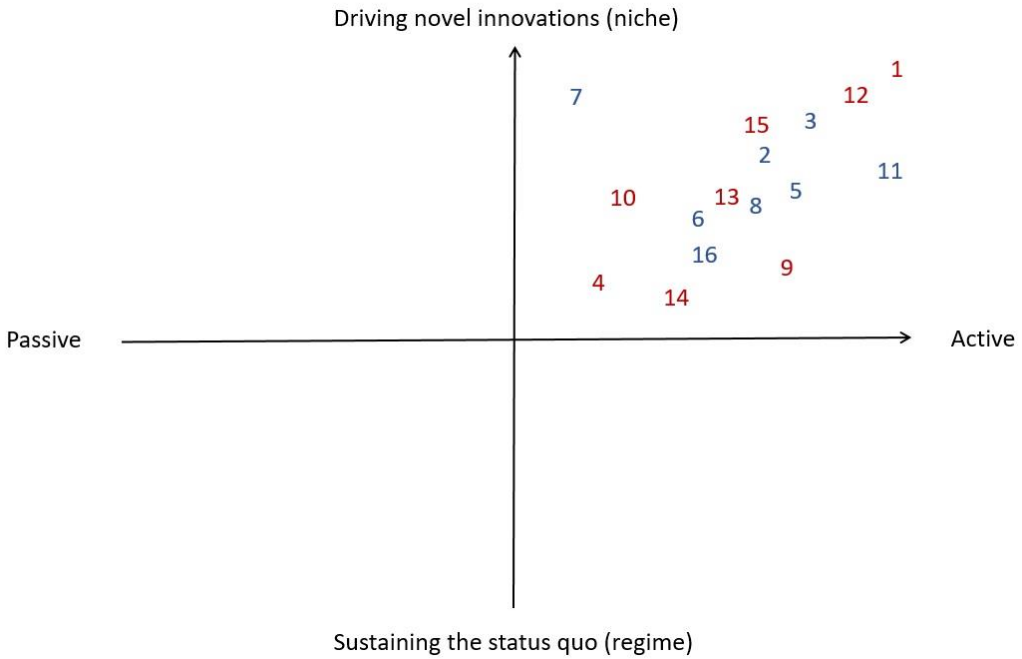

Figure 3 $JHQWV¶ SRVLWLRQLQJ LQ WKH VRFLR

Whereas the purpose of this categorization was to find particularly active agents of
sustainabilitytransitions, the agents themselves also appeared to position themselves within the
³DFWLYH´ FDWHJRU\ $QG HYHQ WKRXJK VRPH DJHQWV UHS
the selected agents stated that they were willing to transform the current system. While the most
cautious agents of our study appeared to represent the existing system, the most reformist, or
innovative, agent of our sample was initially categorized as a representative of the regime. In
addition, every one of the respondents noted serious challenges related to the existing system.

2YHUDOO WKH DJHQWV ZKR ZHUH FDWHJRUL]HG ZLWKLQ
be somewhat more active, and the dispersion between their positioning is smaller compared to the
agents who represented the regime. Table 2 compares our tentative agent categorization to the
DJHQWV¶ RZQ DWWLWXGHV DERXW WKH H[LVWLQJ V\VWHP

Table 2. $JHQWV¶ LQVWLWXWLRQDO DIILOLDWLRQ YV

Category	Institutional affiliation: niche vs. regime	$JHQW¶V RZQ niche vs. regime	N

NGO actor	Niche	Niche	1
NGO actor	Niche	Niche	1
NGO actor	Niche	Niche	1
NGO actor	Niche	Niche	1
Sustainability professional in industry	Regime	Niche	1
Sustainability professional in industry	Regime	Niche	1
Sustainability professional in industry	Regime	Niche	1
Sustainability professional in industry	Regime	Niche	1
Green consumer	Niche	Niche	1
Green consumer	Niche	Niche	1
Public actor	Regime	Niche	1
Public actor	Regime	Niche	1
Academic	Regime	Niche	1
Academic	Regime	Niche	1
Entrepreneur	Niche	Niche	1
Entrepreneur	Niche	Niche	1
Total			***16***

Despite our tentative agent categorization, the distinction between the niche and regime agents in the matrix is not as clear as we have stated. The regime agents appeared to be as eager as the niche agents to shape the current system. All the agents sample appeared to view themselves as niche development driving agents rather than agents who were sustaining the existing system. This situation provides implications that the regime included also active agents of sustainability transitions, which leads us to the conclusion (regarding our first research question) that sustainability agency may not always be a driver phenomenon.

$ O W K R X J K W K H D J H Q W V ¶ S R V L W L R Q V Z H U H Wkhing U V X E M L Q W K H ³D F W L Y H ´ F D W H J R U \ L P S O L H V W K D W W K H D J H Q W V sustainability transitions compared to the mainstream, regardless of their positioning in the socio W H F K Q L F D O V \ V W H P % \ ³P D L Q V W U H D P ´ Z L W K R W K H socio-technical system would not actively engage in sustainability transitions.

4.2. How is agency formed and sustained?

It should be noted that our study set out to examine the rationales of individual agents through their life courses. In practice, however, different agents had several overlapping themes in their interests and rationales. We found several overlapping themes that appeared among almost all of the 16 interviews. Through our theory-based data analysis, we indicated four aggregate concepts that aimed to answer our research questions about agency formation and sustaining. Our aggregate dimensions can explain either the agency formation process or can explain why individuals are capable of sustaining their agency even when they encounter challenges or experience difficult conditions. The four aggregate dimensions we identified include life path, individual vs. collective mind-set: belief vs. critique, and holism.

We scrutinize all four of the aggregate dimensions later in our study, as they are related to our research questions and to the eight lower-level themes, which were integrated from the overlapping themes that appeared and that were conceptualized within the first phase of our data analysis. The second order themes of our data analysis included (1) upbringing and education, (2) an awakening moment W K D W D O W H U H G D Q D J H Q W ¶ V O L I H F R X U V H L Q W U L Q V L F a feeling of inadequacy, (5) a strong belief in a sustainable future, (6) criticism of the current system, (7) a lack of a value-action gap, and (8) socio-physical unity.

Of our four aggregate dimensions, the life path appears to be an essential factor in explaining the agency-formation process. Two aggregate dimensions, individual vs. collective and holism, are more descriptive of the rationales for sustaining the agency than of the actual agency-formation S U R F H V V , Q D G G L W L R Q W K H V H J U E H D W H I G Y L P H F Q V L W R Q F R P P 8 ´P agency formation and the maintenance of agency. Figure 4 shows the data structure of our analysis that led to the aggregate dimensions as well as describing the agency-formation process and how agents sustain their agency. The data shown in Figure 4 was generated from the internal worlds of the active agents of sustainability transitions through their life courses.

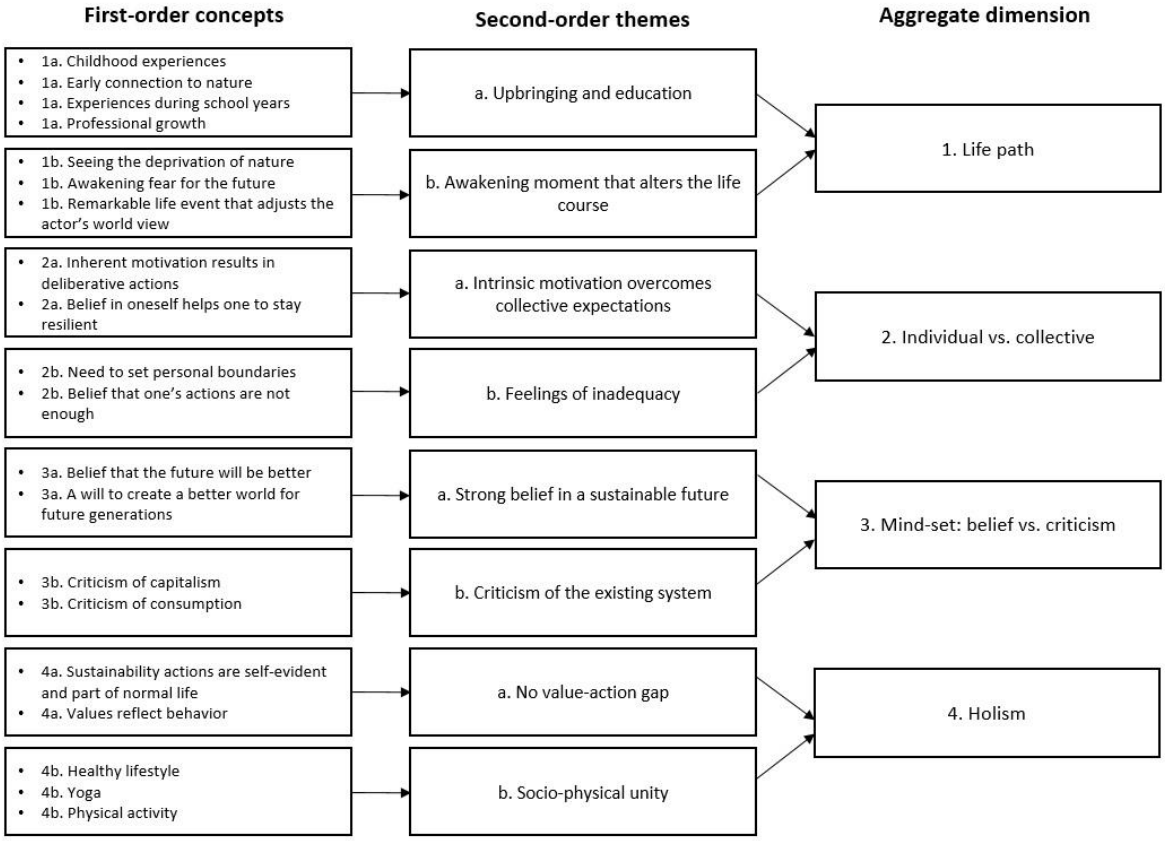

Figure 4. Data structure that led to explaining agency formation and maintenance

In the following sections, we portray how our four aggregate dimensions relate to and explain our research questions.

4.3. Agency formation in 1. Life path

Based on our data, the life path arises as an essential factor in explaining the formation process RI DJHQF\ :H LQGLFDWHG WKH DJJUHJDWH OHYHO RI ³OLIH first-order concepts that related to our second-order themes of upbringing and education or DZDNHQLQJ PRPHQWV WKDW DOWHUHG WKH DJHQWV¶ OLIH

4.3.1.1a. Upbringing and education

7KH DJHQWV¶ QDUUDWLYHV DERXW WKHLU XSEULQJLQJ DQG childhood events that had created interest about sustainability and had eventually led to deliberative actions in the future. Some agents, for example, described how they had played in the forest as children or had spent their summers at cottages in the country in their youth. Agents were able to determine that their later integration with nature and their sensitivity toward nature had originated from these meaningful moments. In addition to childhood memories, several respondents stated that their time in school influenced their present sustainability activities. Some agents, for example, discussed how sustainability-related studies felt like a calling to them.

A few interviewees also stated how they had pursued sustainability studies at a time when actual sustainability studies were absent or were only recently emerging. This situation was partly explained by the fact that many of the interviewees had sustainability-related degrees. Still, it appeared that their time in school had influenced several agents' formation processes. In addition to their studies, many of the interviewees also described how their professional growth had shaped their views on sustainability and had strengthened their will to act on behalf of a sustainable future. For example, some agents stated that sustainability challenges were evident in their typical workdays, and the constant information they received about sustainability challenges gave them new views about the world and made them engage in sustainability actions in both their professional and personal lives. Table 3 presents several representative quotations from the first phase of our data analysis in relation to the associated first-order concepts. (As noted earlier, these quotations have been edited slightly for clarity in English.) Table 3 covers the concepts under the second-order WKHPH ³XSEULQJLQJ DQG HGXFDWLRQ´

Table 3. Data supporting the aggregate dimension of life path UHJDUGLQJ ³XSEULQJLQJ DQG HGXFDWLRQ´

Associated first-order concept	Representative quotations
Connection to nature in their early years	3.1 ³7KLV VRPHKRZ VWDUWHG LQ HDUO\ FK forest a lot. Today I also understand the significance of forests through my work. I mean, the rainforests are irreplaceable, and the northern coni forests act as carbon sinks. But I still think that forests are also extre LPSRUWDQW SODFHV IRU FDOPLQJ GRZQ D
Experiences during studies	3.2 ³0\ LQWHUHVW LQ ELRG\QDPLF IDUPLQJ summer, when I learned how much the forestry sector uses pesticides. was this one guy who used so much pesticide every day, all the time, that insane. It also meant that we needed to clean our stuff every day, all the ti DQG WDNH VKRZHUV FRQVWDQWO\´ 3.3 ³, UHPHPEHU WKDW DW WKH +HOVLQNL 8 at the time. It was not in the chemical department—it was in the wood-processing depart PHQW %XW \HV WKH\ KDG FR HQYLURQPHQWDO WHFKQRORJ\ ² DQG of course,

	exaggerating a bit ¶ : R Z , Z D Q W WR JR WKHUH DQ are able to create something for the end of KH SLSH DQG KHO
Professional growth	3.4 ³ 6 X V W D L Q D E L O L W \ L V V X H V D U H S D U W R I the Center for economic development, the focus was on top soil. But late center] had a wider focus on environmental policy and waste management, H [D P S O H 7 R G D \ , ¶ P Z R U N L Q J Z L W K W K H \ W K U R X J K 1 * 2 V ´ 3.5 ³ , W K L Q N D O R W D E R X W K X P D Q U L J K W V mean, if you think about those so-called risk countries in the Far East and i (D V W $ I U L F D \ R X Q H H G W R F R Q V L G H U W W K L Q N L Q J D E R X W W K H V H W K L Q J V D O R W \

4.3.2.1b. Awakening moment altering the life course

, Q D G G L W L R Q W R W K H ³ X S D W K ´ L Q W H U Y L H Z V , W K H D J H Q W V G H V F U L E H G ´ O L
awakening moments in their narratives that had influenced their life courses. The changes in their life courses had resulted in the agents' formation process. Some of these meaningful moments were positive by their very nature. For example, one agent described the experience of a golden eagle flying extremely low over him. This moment had triggered his lifelong interest in bird watching.

Some interviews, in contrast, included certain elements of crisis that had radically altered the H [L V W L Q J W U D M H F W R U \ R I W K H D F W R U ¶ V O L I H F R X U V H 0 F
moments or points that had led to a chain reaction where their sustainability actions had gradually started to grow. For example, one agent described how he had awakened to taking deliberative sustainability action after he had calculated his carbon footprint; he was simultaneously forced to consider the consequences of actions while thinking of possibilities for making a difference.

6 R P H R I W K H D F W R U V ¶ D Z D N H Q L Q J P R P H Q W V D S S H D U H G
example, or as an awakening of being frightened about the future. These moments shaped the agents' O L I H F R X U V H V L Q V X F K D Z D \ W K D W W K H \ V W D U W H G W
includes representative quotations of concepts under the second R U G H U W K H P H ³ D Z D N H Q L Q
D O W H U L Q J W K H O L I H F R X U V H ´ 2 Y H U W K ´ O D S W K H U J W R G W
L Q G L Y L G X D O R U D J H Q W ¶ S H U V R Q D O J U R Z W K L Q G L I I H U H

Table 4. Data supporting the aggregate dimension life path U H J D U G L Q J ³ D Z D N H Q L Q J
D O W H U L Q J W K H O L I H F R X U V H ´

Associated first-order concept	Representative quotations
Seeing the deprivation of nature	4.1 ´ % H I R U H W K H F R D O L Q G X V W U \ K D G D O O caused coniferous trees to drop their needles. At the time, in Kokemäki [a in southwestern Finland], Kemira had a fertilizer manufacturing plant, and when we traveled through Kokemäki to Pori, we could actually see these black fo $ F W X D O O \ W K H \ ² W H Z H U H Q ¶ W ³ G U R S S L Q J W K H L U Q H H G O H V ´ E D F N W R W K H W U Z H U H K D O I E D O G ´
Awakening concern about the future	4.2 ³ 7 K H V H W K L Q J V V W D U W H G W R L Q W H U H V \ started to frighten me. At the time, the main thing was climate change. U H P H P E H U K R Z X Q S O H D V D Q W L W Z D V , ´ M

	Inconvenient Truth came out , F R X O G Q ¶ W H Y H Q Z D W F K > F O L P D W H F K D Q J H @ I H O W O L N H V X F K D K X
Remarkable life event that adjusted the D J H Q W ¶ V view	4.3 ´ , K D G S U R P L V H G W R V W X G \ ) L Q Q L V K F course, first I needed to figure out which firms were relevant for the stu Among others, there was Pöyry Oy, which had done some sort of consulting over there; then there was a Valmet Oy factory in São Pau somewhere nearby, and they sold tractors for removing the forest. Severa S D S H U F R P S D Q L H V Z H U H D O V R R S H U D W L Q international, business, was quite biased toward the forestry industry. Oka I did most of my interviews for the study in or near São Paolo, but since of the travel plan was to go to the Amazon, I also went there. We travele riverboat from the Atlantic coast (from Belém) a couple of days upstrea Manaus. From there I traveled to the middle of nowhere. I mean, Mana already in the middle of Q R Z K H U H E X W L W ¶ V V W L O O D From there I traveled even farther; I flew in a small plane for a couple of to really the middle of nowhere, to a small town called Rio Branco, wher one spoke anything but Portuguese. Fortunately I had a translator with me. I al did interviews in Rio Branco, and I had already met with a few administr representatives. I had formed kind of a general view about the phenom Okay, so now we get into the core of this issue. At the time, the deforestation o the Amazon was all over the news in Western countries, since, for examp % R G \ 6 K R S K D G D F D P S D L J Q F D O O H G µ 6 W environmentally conscious circles, people acknowledged that the Am rainforest was being destroyed for cultivation. At the time the understandin that the rainforests of the Amazon are equivalent to the lungs of the Ea course, now we know that this is not the case. But at the time, the underst was that the Amazon was the lungs, and people thought that the lungs o Earth were now being chopped down. At the time, climate change was topic, but the label of destroying an area of rainforest equaling the area of s football fields a day for cultivation as bad. The method they used to rem W K H U D L Q I R U H V W Z D V F D O O H G µ V O D V K D Q burned down in order to acquire farmland. Then I was there, and I saw ho rainforest was being burned down and turned into farmland, and I saw how the neighboring areas had already been changed into farmland. The people w this came from southern Brazil, which was already overpopulated then to mention how overpopulated the place is today. So they had left southern with the hope of a better life and for subsidies from the Brazilian governm Of course, the subsidies were really small. I mean, my travel expenses were compared to these subsidies. But anyway, they left for the Amazon becau got money from the gove Q P H Q W W R µ U H P R Y H W K H U D looking at this issue is to think that Brazil subsidized the deforestation of its U D L Q I R U H V W , P H D Q W K D W ¶ V R Q H Y L H Z S V H O O H U ¶ V S R L Q W, there will be fields. There will be a need f W U D F W R U V V R W K H U H ¶ V D P D U N H W ¶ 7 K L \ Then there was this viewpoint of the actual operator of the process [of c down the trees]. [The job] was a possibility for a better life, or at least for a mo independent life, in any case. But all in all, it was a possibility to achie normal life through farming. And Westerners moralized this whole thing in heads. So when you think about this, everyone was actually acting rationally I U R P W K H L U R Z Q Y L H Z S R L Q W 6 R W K H % R G W K H I D P L O \ Z K R ¶ V U X Q D Z D \ I U R P W K H I D Y

government? they all acted reasonably, according to their own viewpoints, S
the end result was the rainforest was being destroyed. So at the begi
G L G Q ¶ W U H D O L] H Z K D W Z D V J R L Q J R Q L Q P \ V W X G L H V
anywhere else? , ¶ G Q H Y H U K H D U G W K H S K U D V H µ H
I learned that W K L V W K L Q J Z D V D Q µ H [W H U Q D O
I discovered these basic concepts from environmental economics. Probabl
V R P H D U W L F O H E X W K R Z , I R X Q G W K D W ,
no Internet. But somewhere I found this information, and then I understood th
within this operation, the external costs were invisible. For that reason, s
things were being done at the system level, even though at the individ
stakeholder level, things made sense; the concept was the destruction of th
environment, or contamination, if those were thought of as emissions. Thi
actually the starting point for me to get in touch with the terminology, and
, V W D U W H G W R W K L Q N µ 1 R Q H R I P H R S O H L Y H G R Q H
W K L Q J V W K L V Z D \ : K \ D U H W K L Q J V G R Q H
W K L V S U R E O H P H Y H U V L Q F H ´

4.4 ´ : K H Q , O L Y H G D E U R D G , R I W H Q W R R N \ F
V L Q F H H V S H F L D O O \ D W W K H E E J H J L Q Q L Q J R I
L Q) L Q O D Q G , W K R X J K W W K D W Z D V D E L W
V L W H Y H U \ 6 X Q G D \ D W R Q H Z R P D Q ¶ V P H G L
Z H L U G E X W W K H Q , Q R W L F H G > K R Z , ¶ G D F
V X U H Z K D W , ¶ G D F W X D O O \ J R W W H Q I U R P
U H P H P E H U W K D W D I W H U , ¶ G E H H Q J R L Q J
three years, I was spending the time thinking about the meaning of life and what
our bigger purpose was in life. Then one Sunday I came home, and I sta
write in my journal. I did that quite a bit already, but then I also started to
these flip charts out, and I just completely filled my house with these flip charts,
where I wrote down my mission in life. I was very confused, since some
O L N H ¶ 7 K H P H D Q L Q J R I O L I H L V W R V D Y H W
X V L Q J K X P D Q S R W H Q W L D O ¶ F D P H X S , O R
of frightening, since my current professional career has almost nothing to do
W K L V 7 K L V D O O V R X Q G V Q L F H E X W L W ¶ \
S U R I H V V L R Q D O S D W K G L G Q ¶ W P D W F K Z L W K
the meaning of life was now written down on these charts, and I thought that
would be a great dream to pursue for the rest of my life. After that mom
started to somehow more actively take notice of this field [i.e., sustainab
and to create links to the field. I started to be partially aware of this thing, and
H [S H U L H Q F H G W K L V S H U V R Q D O D Z D N H Q L Q J

4.4. Sustaining the agency 2. Individual vs. collective

We indicated earlier that the dichotomy between individual and collective expectations was a strong incentive for the agents we studied to sustain their agency. This distinction between individual and collective expectations appeared as a strong paradox in the lives of the agents.

4.4.1.2a. Intrinsic motivation overcomes collective expectations

It was typical for the agents to feel that their motivation was stronger than those expectations that arose from outside their internal world. Based on the interviews, most of the agents had clearly

encountered difficulties during their time of being engaged in sustainability actions. For example, some agents spoke of how they had felt forced to change their professional positions or career paths in order to connect their work with sustainability actions. One respondent also described how her whole professional career had been very scattered, and how her longest contract of employment had lasted only two years.

7KH VWURQJ LQWULQVLF PRWLYDWLRQ DQG EHOLHI WKDW to remain resilient, even if the existing system could not be changed, also influenced actions. For example, one agent described how she had encountered a lot of bullying during her early years because of her choice of actions, but she was certain that her choices were better for the environment, so she maintained her resilience even though her surroundings did not support it. Another agent portrayed how she had actually grown stronger through her tribulations; she stated how it would not have mattered if she lacked money or a good position, since she would have been happy without any material status. Table 5 portrays the first-order concepts with selected representative quotations in relation to the second-order theme ³,QWULQVLF PRWLYDWLRQ UHVXOWV LQ GHOLEHUDWLYH DFWLRQV´

Table 5. Data supporting the aggregate dimension individual vs. collective regarding ³,QWULQVLF PRWLYDWLRQ RYHUFRPHV FROOHFWLYH

Associated first-order concept	Representative quotations
Intrinsic motivation results in deliberative actions	5.1 ´7KH UHDVRQ ZDV WKDW there was a market demand, which resulted, in a way, that we needed to start our own firm, since no already established company could have done this because the already HVWDEOLVKHG RQHV GLGQ¶W Z example, of Pöyry Oy, they couldn¶W HYHQ WKLQN WK HQYLURQPHQWDO PDQDJHPHQW FRQVXOWLQ things. I mean, really, at the time, environmental management consulting was a wingnut thing. So there was no other way to execute this mission than to establish D ILUP ZLWK D IHZ IULHQGV ´ 5.2 ´7KH ODVW \HDU >DW)LQIRRG@ ZDV UHDO P\ YDOXHV DQG , WKRXJKW ¶, V WKLV UHDO
Belief in oneself helps one to stay resilient	5.3 ´, I , ZRXOGQ¶W stop doing this for some reason, I would tear every part of my away along with it. For example, my friends are largely doing these same t WR R ´ 5.4 ³, IRXQG LW UHDOO\ QLFH WR develop myself as a person, but since my background is in business administration, where the values are techno-HFRQRPLF LQ QDWXUH PDQ\ RI P\ IULH FUD]\ VWXII LV WKDW"¶ VLQFH WKH\ GLGQ¶ Fortunately nowadays, people appreciate this kind of work. Even the skepti DSSUHFLDWH RXU ZRUN HYHQ LI WKH\ GRQ UHFHLYH WKDW PDLO WKRXJK PRVW UHFH ULJKW WKLQJ DQG WKH\ ZRQ¶W stop, just because they don't like it here² I have an organization where we all pull together, and that is unbelie great. I simply believe that when we go forward in a positive and goal-oriented ZD\ ZH ZLOO PDNH D FKDQJH ´

4.4.2.2b. The feeling of inadequacy

Whereas the agents described their strong commitment to sustainability actions as being the result of strong intrinsic motivation and from a belief in themselves, some of the narratives had a different kind of tone: several agents outlined a concern that their individual actions would not be enough to change the future. Many of the agents had also worked to restrain themselves regarding certain sustainability issues in order to prevent themselves from getting burned out. For example, one agent described how she had taught herself to be gentler with herself and to keep in mind that she did not always need to do everything by herself.

The agents also indicated that they often felt that there was much more to do and that their own input was simply inadequate. For example, one agent described how, if she allowed it to occur, she felt a constant sense of worthlessness. This sensation of inadequacy, however, also led agents to stay engaged in sustainability transitions. Table 6 presents the first-order concepts with several quotations in relation to the second-RUGHU ³IHHOLQJ RI LQDGHTXDF\´

Table 6. Data supporting the aggregate dimension individual vs. collective regarding the ³IHHOLQJ RI LQDGHTXDF\´

Associated first-order concept	Representative quotations
Need to set personal boundaries	6.1 ´5HDOLVWLFDOO\ ZH QHHG WR VHW ERXQ ourselves too much, or even to burn out. At the end of the day, I still believ even one person can make a difference. I pay special attention to not doing ar ZRUNLQJ WKH HYHQLQJV DQG RQ WKH crucial to have something else, too. It brings me some peace that on Fri NQRZ ,¶YH GRQH LPSRUWDQW WKLQJV DQG something else When I was in my twenties, I was really close to burning out, so it was nece IRU PH WR OHDUQ P\ RZQ OLPLWV ´
	6.2 ´6RPHKRZ ,¶YH UHFRJQL]HG WKDW ZH RQC that we have to make conscious choices about careers and personal lives. \ QHHG WR VWUXFWXUH SURWHFW RXU UHVRXU DEOH WR GLYLGH P\VHOI LQWR IILYH YHUVLF DQG , IHHO EDG VLQFH , FDQ¶W GR PRUH ´
Belief that RQH¶V DF are not enough	6.3 ³« EXW ZKHQ \RX NQRZ KRZ PXFK PRUH \RX LV DOZD\V SUHVHQW , PHDQ RI FRXUVH , G
	6.4 ´6RPHWLPHV , ZRQGHU KRZ , FDQ PDNH D 200 people think these things, when somewhere else, 2 million people are LQ WKH RSSRVLWH ZD\ ´

4.5. Agency formation and sustaining the agency-3. Mind-set: belief vs. critique

Our third aggregate dimension is the dichotomy between strong belief and strong critique ZLWKLQ DJHQF\¶V PLQGVHW WKDW WKLV GLFKRWRP\ was a key explaining factor for the agency-formation process as well as for sustaining the agency. This dichotomy appeared where agents had a clear vision about a more sustainable future while simultaneously being heavily critical of the existing system and its practices.

4.5.1.3a. Strong belief in a sustainable future

Agents described how their hope for a more sustainable future had led them to engage in sustainability-related actions. The vast majority of our interviewees had a strong sense that the future would be brighter, even though they also stated how they were concerned about the current situation. For example, one agent portrayed how she had to constantly think about various sustainability-related threats in her work, and for that reason, she thought that all the ingredients for a catastrophe were in place. Despite these negative feelings, she still had a strong belief that society would find solutions for these threats. Another agent described how he typically did not hold a particularly optimistic view of the world, but he nevertheless stated that without a belief in positive change, he already would have given up on his sustainability actions. In other words, this belief in the future had helped the agents to sustain their agency.

Another repeating theme during the interviews was the strong will to create a better future for future generations. As one respondent stated, it was crucial for her to contribute to ensure that the children of the future would be able to live decent lives. These themes created more belief for the agents and helped them to engage and stay engaged in their sustainability transitions. Table 7 shows the first-order concepts with selected quotations in relation to the second-RUGHU WKHPH RI ³VWURQJ DEHOLHI LQ D VXVWDLQDEOH IXWXUH´ mindset: belief vs. critique.

Table 7. Data supporting the aggregate dimension mindset: belief vs. critique regarding ³VWURQJ DEHOLHI LQ D VXVWDLQDEOH IXWXUH´

Associated first-order concept	Representative quotations
Belief that the future will turn out better	7.1 ´«, KDYH OHDUQHG ZKDW D KXJH DPRX FDQ DFKLHYH, ZKLFK Extremely important for me to maintain hope. I gues FRXOGQ¶W GR DQ\WKLQJ LI , GLGQ¶W EH these problems. But it will still demand a pretty big change in our colle WKLQNLQJ ´ 7.2 ´7KH LPSRUWDQFH RI EHOLHYLQJ Definitely more easily after the Pari DJUHHPHQW WKH IXWXUH ORRNV EULJKW
Will to create a better world for future generations	7.3 ³$W WKH HQG RI WKH GD\ , FDQ VD\ W 7.4 ´, ILQG HQHUJ\ Extremely important, since I tend to spend a lot of ti ZLWK NLGV ´

4.5.2.3b. Criticism of the existing system

In addition to their belief in shaping the current system for the better, the agents showed a strong mindset of criticism. Their criticism was typically targeted toward the existing system. Many agents described during their narratives how something should be done to the existing system, which is based on capitalism and on increasing consumption. They said how it would be crucial to limit growth and consumption, even if these things were not widely discussed outside their niche. One agent stated how all consumption harms the environment; another respondent expressed his concern about the oil industry, and how the debate about energy systems is still concentrated on the fear of running out of oil, rather than on creating competitive, and more sustainable, alternatives to oil.

One agent pointed out this criticism by hoping for a new economic paradigm in which environmental values would be as important as economic values. This criticism of the existing system both formed the agency as well as sustaining it. Table 8 shows the first-order concepts

among representative quotations related to the second-order theme ³FULWLFLVP RI WKH PH RI WKH H[LVWLQJ V\VWHP´ the aggregate theme of mind-set: belief vs. critique

Table 8. Data supporting the aggregate dimension mind-set: belief vs. critique regarding the second-order WKHPH ³FULWLFLVP RI WKH H[LVWLQJ V\VWHP´

Associated first-order concept	Representative quotations
Criticism of capitalism	8.1 ´-XVW QRZ, WKRXJKW DERXW HQHUJ\ SROLF For example, we can talk about how wind energy and solar energy are unpro and how taxpayers subsidy these things. I mean, we could do so for this [type of energy]. I mean, really, if we would honestly talk about how much countries VSHQW LQ VXSSRUW RI RLO GULOOLQJ RYHU \ 8.2 ´,I \RX WKLQN DERXW WKH ELJ SLFWXUH WHD¶I gone too far with this capitalistic mode of excessive growth and the exce industrial profit-VHHNLQJ ZRUOG YLHZ´
Criticism of consumption	8.3 ´:H¶UH OLYLQJ LQ D FXOWXUH RI GLVKRQ dishonesty of intelligence is still in charge, since earlier, the increasing mat ZHDOWK DFWXDOO\ EURXJKW PRUH ZHOOQHVV 8.4 ´2K ER\, DOZD\V WKLQN WKDW DV D FRQ\ WKHQ, VHH WKHVH ¶:LVK >:LVK FRP@)00 PHPEHUV IRU H[DPSOH ZKR DUH H[FLWHG D

4.6. Sustaining the agency-4. Holism

$V RXU ILQDO DJJUHJDWH GLPHQVLRQ ZH LGHQWLILHG sustainability is included in the everyday lives of the agents; holism also describes how agents are capable of sustaining their agency.

4.6.1.4a. No value-action gap

Overall, the sustainability actions of everyday life, such as preferring a vegetarian diet or choosing to ride a bicycle instead of driving, were self-evident and integral parts of the normal lives of the agents. For example, one agent stated how he commuted to work by bicycle every day, whether it was winter or summer. Another agent questioned if recycling was even a sustainability action, since it was so self-evident for her. Another repeating concept during the interviews was KRZ DJHQWV ¶ YDOXHV UHIOHFWHG WKHLU DFWXDO EHKDYLR

Several respondents indicated how they aimed to act on what they believed, and they provided several examples from such situations. For example, one respondent said that he did not want to do anything that would harm either animals or the environment. Another respondent described how she felt that it was only natural that she used renewable energy in her household, used a bicycle to work, recycled everything she could, and grew some of her own food herself. Table 9 presents the first-order concepts with representative quotations in relation to the second-order WKHPH RI value-DFWLRQ JDS´

Table 9. Data supporting the aggregate dimension holism UHJDUGLQJ WKH ³QR YDO JDS´ WKHPH

Associated first-order concept	Representative quotations
Sustainability actions are self-evident and part of normal life	9.1 ³6R HYHU\WKLQJ KHUH >LQ WKH RIILFH 9.2 ´(YHU\ WLPH \RX EX\ VRPHWKLQJ \RX today I put cardboard boxes in the recycling bin. But, you know, thos WKH NLQGV RI WKLQJV \RX¶YH DOZD\V G as being environmentally friendly act´
Values reflect behavior	9.3 ´$V DQ RUJDQL]DWLRQDO OHDGHU ,¶P RI FRXUVH ,¶P SURXG RI DOO WKH UHVXO WLPH ,¶YH EHHQ KHUH ,¶YH DOZD\V thinking WR JHW KHU ,W GRHVQ¶W PDWWHU ZKR G VRPHWKLQJ JRRG´ 9.4 ´, ILQG WKDW ,¶P YHU\ OXFN\ DQG SU accordance with my values² I mean, environmental protection and taki care of all that² SHRSOH KHUH KDYH D JRRG SOD

4.6.2.4b. Socio-physical unity

$JHQWV¶ HYHU\GD\ DFWLYLWLHV ZHUH GHVFULEHG DV they also described how overall, taking care of their personal lives helped them to stay resilient and true with their sustainability actions. For example, they highlighted the role of exercise and proper sleep. One agent described how she systematically aimed to eat a healthy diet, sleep better, and generally be positive.

Another prominent concept in the data on socio-physical unity was yoga, which appeared to be an interest that assisted the agents in maintaining their agency. For example, one agent spoke of how his father had been influenced by the yoga philosophy in the 1970s, and for that reason, the whole family had eventually adopted a vegetarian diet, which was revolutionary at the time. Table 10 shows selected quotations from the first-order concepts under the second-order theme ³VRFLR-FXOWXUDO XQLW\´

Table 10. Data supporting the aggregate dimension holism LQ WKH ³SKYSRE EROLVP XQLW\´ theme

Associated first-order concept	Representative quotations
Healthy lifestyle	10.1 ´, DOPRVW QHYHU GULQN DOFRKRO , G exercise a lot, and I prefer an active everyday LIH ´
Yoga	10.2 ´0DQ\ SHRSOH ZKR DUH DVVRFLDWHG ZL VR GRa yoga¶ instructor for two yoga groups. I assume that the centra RI \RJD¶V violence approach can be linked with the view of avoid SHVWLFLGHV LQ RUJDQLF IDUPLQJ ´
Physical activity	10.3 ´0\ HQYLURQPHQWDO FRQVFLRXVQHVV comes from a love of nature² or maybe from a love of nature² and from the fact that I feel so goo ZKHQ ,¶P LQ WKH IRUHVW DQG RI FRXUVH

4.7. Synthesis

Based on our analysis, we now aim to describe how the different aggregate levels relate to two of our research questions: (1) How does agency form? and (2) How do agents stay engaged in sustainability transitions? Figure 5 presents the dynamics between the indicated aggregate levels. As mentioned earlier, we have divided our aggregate levels into two categories: agency formation or sustaining of the agency.

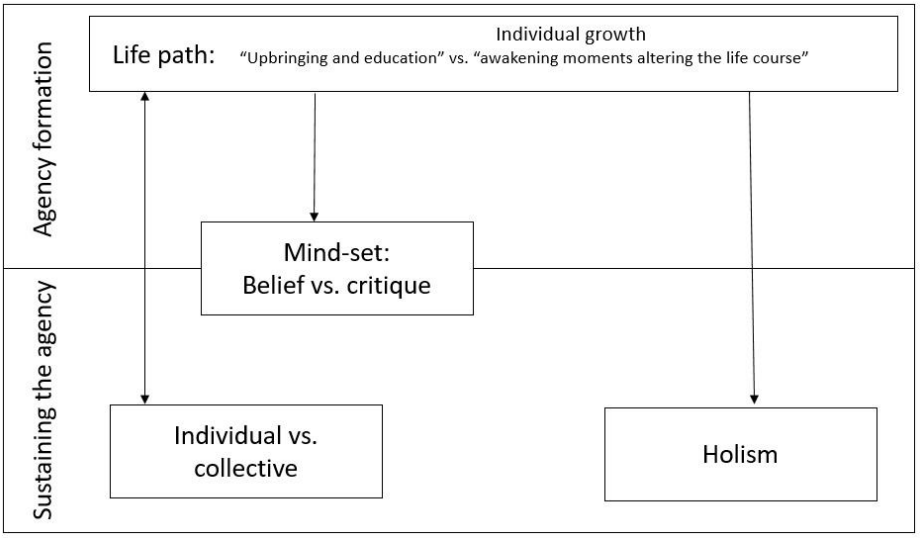

Figure 5. Dynamics of active sustainability agency formation and maintenance

We were able to distinguish one clear rationale that had led the agents to engage in deliberative V X V W D L Q D E L O L W \ D F W L R Q V W K H D J J U H J D W H G L P H Q V L R Q R W K D W D J H Q F \ I R U P D W L R Q R F F X U Vinginglawakeducationwhoughk D Q D U H P D U N D E O H H Y H Q W V W K D W F K D Q J H W K H D J H Q W ¶ V F R X U V described memories related to sustainability (which might appear as sensitivity toward nature, for example) and stated that their interest in sustainability had grown during their life course. Other agents stated that their interest had been awakened, or at least significantly increased, because of a meaningful life event, for example from seeing a lorry or mechanism of deforestation in practice.

We have also indicated two main rationales that helped agents to sustain their engagement in V X V W D L Q D E L O L W \ W U D Q V L W L R Q V Z K L F K Z H U H W K H D J J U H J ³ K R O L V P ´ 7 K H D J J U H J D W H G L P H Q V L R Q R I L Q G L Y L G X D O Y V in actions based on their endogenous interests. Strong individual desires, which often originate I U R P D J H Q W V ¶ L Q W H U H V W V R Y H U F R P H F R O O H F W L Y H H [S H F that they believed so strongly in their cause that it helped them stay resilient and to overcome any hurdles they encountered within their life courses. Many agents had even chosen their career paths because of sustainability interests. Some agents had chosen entirely new, since their earlier professional paths had not met their sustainability-related values and interests. Still, even though W K H D J H Q W V ¶ V X V W D L Q D E L O L W \ D F W L R Q V Z H U H Y D U L H G D mattered, they also mentioned sensations of inadequacy numerous times. Sometimes they even questioned the overall influence of any one individual. Despite this dichotomy in our data, this feeling of inadequacy appeared to be a rationale for actions and urged the agents to stay engaged

L Q V X V W D L Q D E L O L W \ W U D Q V L W L R Q V 7 K L V G L F K R W R P \ D O V I
of inadequacy appeared to be the largest dichotomy related to their life course.

7 K H D J J U H J D W H G L P H Q V L R Q R I ³K R O L V P ´ s X Q G H U O Y L Q G K R Z
connected with their values that their sustainability actions of everyday life, such as using public transportation or decreasing their consumption, were a self-evident and natural part of life. In addition, agents often preferred healthy lifestyles, which helped them to relax and stay resilient.

7 K H L Q G L F D W L R Q I U R P W K H V H W Z R D J J U H J D W H G L P H Q V L R Q
action kept them engaged in sustainability transitions rather than contributing to the formation process of agency.

7 K H D J J U H J D W H G L P H Q V L R Q E H O L H I P L Q G F U L W L T X H ´ D O V R
interests, which not only resulted in deliberative actions but also sustained their agency. This situation means that the dimension of mind-set fell into both categories: as an explaining factor for agency formation and for sustaining the agency. The mind-set provides rationales for the agents in terms of deliberative action; agents often also described their rationales for engaging in (and especially staying engaged in) deliberative sustainability actions as the desire to create a better future for forthcoming generations. They were also strongly critical of the existing system. Our findings suggest that the agents of sustainability are more resilient than mainstream, both in terms of engaging in sustainability transitions as agency formation but also in sustaining their agency capabilities.

7 K H D J J U H J D W H G L P H Q V L R Q R I ³O L I H V W D Z K í E D V H D U H G W
other aggregate dimensions, which may partly be explained by the fact that our interview questions Z H U H L Q W H Q W L R Q D O O \ I R F X V H G R Q H [D P L Q L Q J D J H Q W V ¶ O L
growth during life² whether the growth is the result of upbringing and education or through awakening moments² typically include a whole psycho-cognitive construct of an individual. Hence, our other aggregate levels D J H Q W V ¶ H P E H G G H G L Q W K H G L F K R W R P \ E H W Z H H
worlds and pressures resulting from collective expectations, and D J H Q W V ¶ K R O G H Q W L F O L I
V H H Q W R E H G H U L Y H G I U R P D J H Q W V ¶ O L I H F R X U V H V

5. Discussion

To better understand the role of individuals in creating a more sustainable future, the aim of this paper was to examine the agency of sustainability transitions through three research questions: (1) How does agency form? (2) How do agents sustain their agency? and (3) Is sustainability agency a niche-driven phenomenon? Because our interest is the role of individuals in the transition process of creating a more sustainable system, we will now add to the existing literature with four contributing remarks.

5.1. Contributions

Our main contribution is to offer a more explicit portrayal of the agents of sustainability transitions. While previous research has portrayed agents in sustainability transitions as tools of transformation, we wished to explore the social dimensions of agency. To this end, we used life courses as our analytical lens. The study of life courses helped us to create a more nuanced portrayal of agents of sustainability transitions and their lives. To the best of our knowledge, this is one of the first papers to undertake a life courses approach to the study of active agents in sustainability transitions.

In particular, we observed agents who had a high level of intrinsic motivation for their sustainability actions, since their rationales for engaging in action were derived from pure interest

L Q V X V W D L Q D E L O L W \ U D W K H U W K D Q I U R P S X U V X L Q J D U H Z
motivations for H Q J D J L Q J L Q D F W L R Q K D V H P S K D V L] H G K R Z L Q G L Y
them to pursue activities for the sake of self-interest and for enjoying what those activities provide,
which also leads individuals to perform these activities at fairly high levels [e.g., 64, 65, 66]. This
L Q W U L Q V L F P R W L Y D W L R Q P D \ D O V R H [S O D L Q W K H D J H Q W V ¶
life.

In addition to the distinction of formation of agency and sustaining that agency, our analysis unveiled several dichotomies within the agents' lifeworlds. Our cases seemed to have a life course tinted with extremities. To begin with, the agency formation process was also divided into two categories: those who had grown into sustainability agency and those who had awakened into sustainability agency. Second, the agents were torn between the expectations that the existing system sets and their individual desires and aspirations. This distinction also appeared as strong criticism of the practices of the existing system, whereas the agents still sustained their beliefs in a different, better, and more sustainable future.

The second contribution of this paper was to provide insights into the formation process of sustainability agency. We were able to identify two main paths for agency formation. Based on our analysis, we acknowledge that agency typically forms either through upbringing and education or through certain awakening moments. The dichotomy between upbringing and education and awakening moments is a widely discussed theme in the social sciences, especially in sociology and social psychology. This dichotomy is typically portrayed as different levels of life courses: as the level of historical change and the level of life experience [e.g., 67, 68]. In addition, within the transition-management framework, Loorbach et al. [69] have stated that crises tend to create space for agency and consequently for system transitions. This statement implies that the understanding of the influence of historical change and life experiences is also beginning to emerge within the W U D Q V L W L R Q O L W H U D W X U H 7 R R X U N Q R Z O H G J H K R Z H Y H U
and the effect on the agency-formation process have been absent to date. Hence, our findings provide implications that the same development path (which has already been acknowledged in other social sciences) is also evident within the formation process of agents in the context of sustainability transitions, especially when considering their inner worlds.

As our third contribution, our analysis led us to identify two main rationales for agents to sustain their agency. First, the dichotomy between individual and collective expectations appeared as an incentive for the agents to sustain their agency. Second, holism also appeared as an incentive for the agents to sustain their agency. Both rationales for sustaining their agency could be D V V R F L D W H G Z L W K W K H D J H Q W V ¶ S H U V R Q D O L W L H V 2 X U I L
personality, or cognitive entity, can explain why an agent might remain engaged in sustainability W U D Q V L W L R Q V % D V H G R Q R X U D Q D O \ V L V V X V W D L Q D E L O L W
but also as a meaningful component of their self-image. In addition, we found that agents' Q Z H I R X Q G W K D W D J H Q
yet hopeful mindsets both formed agency but also sustained that agency. This finding highlights Q R W R Q O \ W K H D J H Q W V ¶ L Q W H U Q D O V W U X J J O H V E H W Z H H Q

Overall, our findings draw a sample picture of a sustainability agent as someone who is (1) more resilient than the mainstream, (2) possesses a personality that supports both sustainability agency formation activities but also helps in sustaining the agency, and (3) has a high level of self-knowledge and clear reasoning for engaging and staying engaged in sustainability actions.

Our fourth contribution was the tentative implication that sustainability agency is not only a niche-driven phenomenon. Based on our analysis, the agents of sustainability transition cannot be categorized only as niche agents or as regime agents. Even though some of the agents in our sample

represented the current regime (at least according to their affiliations), they also indicated their willingness to shape the existing system. In addition, the agents in our tentative agent categories did not display any particular differences in their answers. For example, the firm representatives portrayed similar interests and rationales as the entrepreneurs or NGO representatives. It is necessary to note that in this study, we only examined the most active agents of sustainability transitions; agents who were somewhat active or passive were absent from the study. In addition, we did not examine the potential differences between agents' varying roles, which, for example, may target their actions differently within their personal lives compared to their professional lives. In this study, agency was examined from a holistic viewpoint. In order to gain more detailed knowledge about sustainability transitions, agents' various roles in life in relation to their sustainability actions should be studied further in the future. Whereas our analysis revealed that agents of sustainability transitions appear more resilient and more willing to shape the existing system than the mainstream, their positioning within the socio-technical system did not appear to have an effect on these tendencies.

5.2. Limitations and future research directions

This study does have certain limitations. First, our study set out to examine only the most active agents of sustainability transitions; this limitation implies that a study on the less active, or perhaps incumbent, representatives of the socio-technical system could provide entirely different types of findings. Typically, the transition literature emphasizes the dichotomy between regime and niche agents [16], even though regime agents appear to have competing rationales [5]. While our sample of agents set out to study the active agents of sustainability transitions, we also included agents who represented the regime (again, according to their affiliations). The regime agents in our study perceived themselves as being as active as the niche agents of the study, which hence follows Bakker's [4] path that suggests that sustainability transitions who hope to alter the status quo without the restrictions of the current system. But in order to better understand agents who are somewhere between activity and passivity, the life courses of such "in between" agents' daily activities should be studied. A second limitation relates to the study's European country. This limitation indicates that our findings may be altered in a different setting. But the results from a setting of a highly industrialized Western country may provide implications of the formation processes and maintenance of agency in similar countries around the globe.

A third limitation relates to the seeming linearity of the life courses we observed. This linearity is partly explained by the very nature of life course studies: individuals tend to create linear paths when asked, whereas the reality is likely more disorganized than that. But the explicit narratives and descriptions we obtained from the agents pointed to that the agents were extremely capable of describing their life paths and rationales for their actions. This finding may also be a meaningful difference between the active agents of sustainability transitions and the mainstream; the agents had considered their positioning in the socio-technical system and had good reasons to engage in sustainability actions. One reason for this high level of self-knowledge may be explained by the fact that the agents had encountered many challenges during their life courses, and they had been forced to consider their choices as the consequences of their actions. This high level of self-knowledge might also be one component in explaining the strong resilience that appeared within our sample of agents.

A fourth and final limitation relates to the small sample size of the agents in the study. Given that the phenomenon of agency is relatively unknown, we

selected qualitative methods, which are typically used to locate phenomena and capture any insights. Hence, the sample of 16 interviewees was large enough for our aim of unveiling the life courses and formation processes of the agents. Since our study was conducted using qualitative methods, we recommend that this study be continued using quantitative methods. Our research has provided initial implications to understand how sustainability agency forms and is sustained, but a great deal more room exists for research on the different dimensions in the study of agency within sustainability transitions.

Several exciting research avenues related to agency within sustainability transitions are available for future study. For example, one of the largest theoretical debates in the transition discipline is currently focused on the question of how to more explicitly conceptualize and integrate actors and agency into the study of sociotechnical transitions [28]. The integrated L Q I O X H Q F H R I D J H Q F \ V K R X O G W K X V E H H [D P L Q H G I X U W K H courses without any distinctions (such as different roles in life), but in order to achieve a F R P S U H K H Q V L Y H S R U W U D \ D O R I D J H Q F \ W K H S R V V L E O H G L H [D P S O H D J H Q W V ¶ E X V L Q H V V U R O H V D Q G K R P H U R O H V V between regime and niche agents should also be explored more in future studies. In order to gain more knowledge about those agents who are somewhere between activity and passivity, the life courses of such agents should also be studied.

Our analysis has provided several implications for our research question of how individual agency forms in the context of sustainability transitions; scholars could expand those implications and hypothesize that similar trajectories will also apply for collective agency formation. The way in which individual agency grows into collective agency was not a focus of our study. In order to achieve a truly sustainable system, the bridge between individual and collective sustainability agency should be studied more explicitly.

6. Conclusions

With this paper, we set out to explore how the agency of sustainability transitions forms and L V V X V W D L Q H G W K U R X J K D J H Q W V ¶ O L I H F R X U V H V 2 X U R E M we explored how agency forms. Second, we explored how agents sustain their agency. Third, we examined if sustainability agency is a niche-driven phenomenon. In this paper, the life courses of agents were seen to unveil the formation process of sustainability agency and to explain why agents remain engaged in sustainability transitions. We argue that sustainability agency forms either from the experiences agents have had in their early years or from certain awakening moments that have shaped their life courses.

We identified two main rationales for agents to sustain their agency. First, the dichotomy between individual and collective expectations was a rationale in sustaining agency. Second, holism in every aspect of life appeared to be a rationale for the agents in sustaining their agency. In addition, we were able to identify that agents of sustainability transitions may represent either regime or niche development. We would like to argue that this paper has added to the literature by starting to build a more explicit portrayal of agents of sustainability transitions, although further studies will be necessary to narrow the gaps in existing agency research. With this paper, we hope to encourage further work on understanding the entire role of agency in sustainability transitions in order to achieve a truly sustainable future.

Appendix A

THEMES OF THE INTERVIEWS

Who is the agent, and where does he/she come from?
What is his/her relation to sustainability and to sustainability transitions?
- What is the timeline regarding this relation?
- What situational factors influence this relation?
- What rationales influence this relation?

+ R Z K D Y H W K H D J H Q W ¶ V D F W L R Q V U H O D W H G W R V X V W D L
Why is the agent interested in sustainability?
What were the D J H Q W ¶ V P R V W U H F H Q W D F W L R Q V U H O D W H G W R
: K D W K D V F K D O O H Q J H G W K H D J H Q W ¶ V S D W K L Q W H U P V R
How does the agent perceive the current system?
How does the agent perceive the future of sustainability?
What values does the agent have?
- + R Z D U H W K H V H Y D O X H V P D Q L I H V W H G L Q W K H D J H Q W ¶

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