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Photovoice as a visual-verbal strategy for studying contents and processes of social representations: a participatory project on sustainable energy

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ABSTRACT

Photovoice is a participatory action-research strategy that has been mainly adopted to give voice to "unheard" groups. In this article, we adapted this strategy in a study on the social representations (SRs) of sustainable energy shared by young citizens (ages 11–12) in Narni, Italy, a small urban center with a history intertwined with sustainable energy issues. In particular, the study suggests that photovoice could be useful to jointly examine verbal and visual components of social representations and to highlight communicative formats that contribute to shape SRs. Images of sustainable energy produced by participants show technocentric and ecocentric contents, confirming previous studies conducted with adults. Anthropocentric components also emerge, potentially identifying a challenging figurative nucleus. Photo-elicitation and small-group discussions show a twofold communicative activity: reification formats and homogamic communication are used to reaffirm shared representations, and the consensualization format is used when potentially disruptive elements for the community are at stake. Overall, results show the potentialities of photovoice experience for SR research and suggest that photovoice could actually benefit from further in-depth analyses of images and of communication within groups. Implications of the results for civic engagement are discussed.

KEYWORDS

energy transition; photovoice; public engagement; social representations; young citizens

In this article, we propose photovoice as a method for the investigation of social representations (SRs). Photovoice has been defined as "a process by which people can identify, represent and enhance their community through a specific photographic technique" (Wang & Burris 1997, p. 369). We used this strategy in a study on SRs of sustainable energy shared by early adolescents (11–12 years old) in Narni, Italy, a small urban center that is a model in the management of energy issues.

To the best of our knowledge, this is the first time photovoice has been related to social representation theory (SRT) and adopted in a study on young people's SRs of sustainable energy. The main reason behind this

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choice is that photovoice, by combining visual and verbal data in individual and group tasks, allows an examination of images and their use in local interactions, that is, contents and processes involved in the making of SRs.

Specifically, photovoice uses visual images to pursue "three main goals: (1) to enable people to record and reflect their community's strengths and concerns, (2) to promote critical dialogue and knowledge about important community issues through large- and small-group discussion of photographs, and (3) to reach policymakers" (Wang & Burris 1997, p. 370). Participants are first asked to take pictures of a topic (e.g., their environment) to document the aspects they deem important. Photos are then discussed in small groups, in which researchers facilitate exchanges and mutual acquisition of knowledge about that topic. Finally, the photographs and the results of the small-group discussions are shared with the local community and policymakers to involve them in promoting change.

Photovoice thus combines visual and verbal data and potentially provides interesting insights about how the iconic nature of SRs is expressed through multiple mediums, that is, visual images (photos and drawings) and words (spoken and written languages) (Bauer & Gaskell 1999; De Rosa & Farr 2001; De Rosa & Schurmans 1990).

In the following sections, SRT and the potential advantages of using photovoice will be illustrated prior to discussing the current study. Here SR studies on energy with a specific focus on the importance of images will be outlined (see Agustoni & Maretti 2012 and Sovacool 2014 for broader reflections on the contribution of social sciences to the understanding of energy issues).

Social representations theory

According to a classical definition, SRs are systems of knowledge and actions that are socially shared and elaborated; SRs are "system of values, ideas and practices with a twofold function: first, to establish an order which will enable individuals to orient themselves in their material and social world and to master it; and second, to enable communication" (Moscovici 1973, p. xiii). SRT assumes that when faced with important but unfamiliar events or transformations, people engage in cognitive coping processes, that is, meaning-making efforts aimed at interpreting changes and recovering a sense of control over their worlds. Two interrelated psycho-social processes have been identified in this regard: anchoring and objectification. The anchoring process aims to make sense of novelties: the unfamiliar is named and classified, and links are established between new events and the contents and structures of knowledge previously shared (Doise 1992). The objectification process aims at transforming general and abstract ideas into concrete forms of knowledge that, once assimilated, replace the original concept. These

concrete forms of knowledge incorporate the original meanings but are constituted by almost tangible figures and entities, which are easier to be grasped and used in everyday communication than the original abstract concepts. Objectification proceeds across several stages: perceptive selection (i.e., the selective filtering and retention of some information to the detriment of other elements); decontextualization and naturalization (i.e., the separation between contents and their context as well as their presentation as a de-facto reality); and recombination into a figurative nucleus (Moliner & Abric 2015), that is, a compound of images that grasps the core of the concept (Walmsley 2004). In sum, objectification constructs an icon, metaphor, or trope that visibly reproduces and comes to substitute the unfamiliar and complex novelty (Wagner et al. 1999). As Moscovici stated, "when the image linked to a word or idea becomes detached and is let loose in a society it is accepted as reality" (1984, p. 39).

The importance of communication for SRT derives from the assumption that such meaning-making processes are located in the ego-alter relation: representations of an object do not emerge in a vacuum, they are co-constructed in everyday discourse, confrontation, and interactions with other members of the groups we belong to. Moreover, drawing upon the lessons of symbolic interactionism, SRT assumes that the ego-alter relation involves the "generalized other" as well as specific others with whom we interact. As a result, representations emerge from interactions in which participants simultaneously respond to the generalized other (i.e., the culture) and the specific other (i.e., the interactional level) (Castro 2015).

To grasp the dynamics of SRs, the three interrelated levels of ontogenesis, sociogenesis, and microgenesis should also be considered (Psaltis 2015). Ontogenesis refers to the way individuals grow up in a world of representations; as summarized by Moscovici and Marková, "we absorb social representations, starting in infancy, together with other elements of our culture and with our mother tongue" (2000, p. 253). Sociogenesis refers to the circulation, transformation, and dynamics of SRs in society and between groups. Microgenesis refers to the way representations are debated at the interactional level, that is, among the members of a social group (Flick, Foster & Caillaud 2015). It is at this level that a variety of modes of communication can be described, including the use of monological or dialogical relationships, the use of themata, the tendency toward homogamic or innovative communication, the reification or consensualization formats, and others(Batel & Castro 2009; Jovchelovitch 2007; Markova 2003, 2008; Wagner & Hayes 2005). All these modes derive from a fundamental observation about the double nature of SRs, which are both stable and changing, culturally shared and locally negotiated. Indeed, SRs constitute the common ground that enables communication between the ego and the alter. However, the partially shared nature of representations allows for communication: if a

view is entirely shared, communication would not be necessary; on the other hand, if a common ground is totally missing, communication would not be possible (Psaltis 2015).

Photovoice as a strategy for investigating social representations

The combination of the words "photo" and "voice" allows researchers to jointly consider visual and verbal facets, thus coming to a broader understanding of SRs through the use of multiple mediums, as advised by many scholars in the field (e.g., Bauer & Gaskell 1999; De Rosa & Schurmans 1990). Images are part and parcel of the SR processes described so far, and their importance for the genesis, structuring, and transmission of SRs is largely recognized (De Rosa & Farr 2001; Galli 1998; Galli & Nigro 1987). However, there is a relative dearth of research that combines visual data and verbal accounts produced by the same participants. As a method, photovoice contributes to filling this gap in the exploration of SRs.

First, photovoice give access to contents and processes at the base of SRT. Photovoice participants are first asked to individually produce visual materials. However, for any form of communication to be effective it needs to be culturally meaningful and shared to a certain degree, depending on group belongings and individual positioning. For this reason, asking participants to take photos is a way to make explicit and reconstruct shared representations of the social reality (Bauer, Gaskell & Allum 2000). Photos collected through photovoice and images evoked in the discussion can be examined as possible outcomes of cognitive coping processes (Wagner, Kronberger & Seifert 2002). The combination of visual and verbal data can be used to assess specific stages of cognitive coping processes, such as naming and classification in the anchoring process, and selective retention in the objectification process. In particular, the shared contents of images, what has been selected and recombined into a single figure, could be considered as the figurative nucleus (Moscovici 1984).

Second, and linked to the former point, photovoice can be used to examine the ontogenesis of SRs, in particular with samples of young participants. This technique is a mix of individual practice, cooperative art work, and group discussion, which engages participants in communicative activities and entails group consonance as well as individual creativity (Wagner et al. 1999). Photovoice is much more engaging and enjoyable than filling a questionnaire; using it with children is fun and can be easily integrated into classroom activities. For these reasons, it is a useful technique to explore SRs shared by the younger population. Comparisons between data collected through photovoice and data collected through other methods (Flick, Foster & Caillaud 2015; Caillaud 2016) can be used to investigate individual and/or group positioning compared to other groups.

In this study, we suggest that photovoice is useful for exploring the ontogenesis of SRs. Figurative nucleus, identified through the analysis of visual and verbal data, can be compared with societal data in order to understand whether and how young individuals have absorbed the SRs shared by the groups to which they belong.

Third, photovoice is a powerful technique to investigate the microgenesis of SRs. Photovoice participants are asked to use images and to discuss their meanings in small and large groups. The use of images that have been produced by the same participants involved in the discussions adds further advantages to focus groups technique (Caillaud & Kalampalikis 2013). Thanks to their conventional and referential nature, images effectively convey meanings that are easily recognizable by in-group members. The apparent self-evidence of images; that is, the fact that they are accepted at face value expresses the consensual nature of SRs. At the same time, the polysemy of images shows the multifaceted and pluralist nature of SRs, and their evocative power triggers transformations and gives dynamism to representations (Wagner et al. 1999; De Rosa & Farr 2001). Indeed, the use of images as mediums in group discussions reflects the interactional features of SRs already described: a social group can consider an image plausible or not depending on the experiences and negotiated consensus of its members (Wagner et al. 1999). The role of moderator in these discussions is fundamental to make explicit the aspects that the participants may not evoke, as these aspects are taken-for-granted, accepted, and consensual within the in-group (Flick, Foster & Caillaud 2015). Consequently, we suggest that photovoice is particularly useful to investigate the microgenetic process and the variety of communicative modes in which culturally shared contents are evoked, replicated, and negotiated within a given social group (Castro 2015; Rouquette et al. 2005).

Social representations theory and energy transition

Being a participatory action-research strategy, photovoice has been mainly adopted with disadvantaged or marginalized groups. However, it may be useful in many other contexts where the voice of the citizens is unheard. This is the case with energy sustainability, where citizens—and young people in particular—are considered to be crucial, but their voice can hardly be heard (Biddau, Armenti & Cottone 2016; Brondi et al. 2016; Sarrica et al. 2016a). In particular, on the psychological side, constructivist approaches suggest that energy transition itself is a social construction and that several views and images are currently co-present and competing with each other to define what sustainable energy is and how transition should be accomplished (Sarrica et al. 2016b).

In the area of energy studies, SRT suggests that a proper transition will not be experienced unless technological changes and decentralization are coupled with a shift in the representations of the energy system and with the emergence of a new energy citizenship, characterized by perceived agency and environmental consciousness[1] (Batel & Devine-Wright 2015; Biddau, Armenti & Cottone 2016; Devine-Wright 2007; Sarrica et al. 2016a; see also Stern & Aronson 1984).

However, studies we conducted in Italy (the ACCESI project) show that centralized and technocentric views of the energy system are still prevalent in parliamentary debates and the national press. The sustainable transition is represented as a technical issue. Deficit views of the energy public prevail as well: citizens are viewed as lacking consciousness or agency, and they are mainly represented as passive consumers or even as an obstacle to top-down decision-making processes (Brondi et al. 2014; Sarrica et al. 2014; Brondi et al. 2016). Previous studies in the field of SRT of environment and energy have largely examined images in written or spoken verbal reports (Devine-Wright 2008; Devine-Wright, Devine-Wright & Sherry-Brennan 2010; Brondi et al. 2012). Few studies have examined SRs of energy issues using visual materials (Devine-Wright & Devine-Wright 2009; Leggett 2003; Leggett & Finlay 2001; Qualter 1995), and even fewer studies have mixed visual and verbal communication (Devine-Wright & Devine-Wright 2009; Sarrica et al. 2015).

Research conducted in Italy on verbal and written reports showed that the shared images of sustainable energy mainly referred to large-scale power plants (i.e., solar/photovoltaic, wind, and biomass), whereas other images of micro-plants or of energy savings were almost absent (Brondi et al. 2014; Sarrica, Brondi & Cottone 2014; Brondi et al. 2016). A second study considered a large dataset of photographs and used them in small-group, semistructured discussions with young adults. The results showed that ecocentric (natural elements and wild landscapes) and technocentric (visible and tangible technological objects, such as large-scale power plants) images were consensually shared and seem to constitute the figurative nuclei of the SR of sustainable energy. However, the ecocentric and technocentric views were challenged by photos that included urban and industrial contexts. These visual elements that provide anthropocentric views proved to be particularly useful to activate debates on the role that urban areas and everyday practices have in energy transition (Sarrica et al. 2015).

Compared with previous studies, photovoice allows for exploring SRs of sustainable energy in a younger population, which has rarely been considered in this field. Moreover, it enables the collection of visual data that can be used as stimuli in group discussions with the photo creators.

Aim

The overarching goal of this study is to examine whether and how photovoice provides significant insights to the exploration of contents and processes of SRs (De Rosa & Farr 2001; Wagner et al. 1999). To this purpose, we focus on the outcome of a photovoice project about the SRs of sustainable energy shared by young people.

Drawing on the theoretical and empirical premises previously outlined, this goal entails expectations about potential results and their interpretations. Overall, we expect that photovoice, thanks to its consideration of both visual and verbal accounts (Bauer & Gaskell 1999) and to the use of individual and group tasks (Caillaud & Kalampalikis 2013), will be a valuable strategy for exploring (and undertaking research on) SRs.

More specifically, we expect that photovoice will give access to the contents of the figurative nucleus of the SR as well as to anchoring and objectification stages, and it will give insights into ontogenetic as well as microgenetic processes of SRs (Psaltis 2015; Wagner et al. 1999).

First, we expect photos and verbal description collected through this research strategy will give access to the figurative nuclei of the SRs, that is, the complexes of images that constitute the essence and visibly reproduce the idea of sustainable energy shared by young participants. Second, we expect verbal accounts and the analysis of images will show naming and classification as well as selective filtering, which are stages of anchoring and objectification, respectively. Third, concerning ontogenetic processes, we expect data collected through photovoice could be compared with other sources to explore whether early adolescents share ecocentric and technocentric images of sustainable energy, which seem to be largely consensual in Italy (Brondi et al. 2014; Brondi et al. 2016; Sarrica et al. 2015). Fourth, considering early adolescents as active community members (Brondi, Sarrica & Nencini 2012; Tonucci & Rissotto 2001), we hypothesize the group discussions will give access to microgenetic processes. We expect photovoice will foster communicative interactions in which participants evoke, negotiate, challenge, and add unexpected elements to the SRs of sustainable energy.

Method

Participants

The participatory research was conducted in Narni, a hill town of about 20 000 inhabitants, located in the Umbria region in the center of Italy (Figure 1). It involved approximately 150 pupils (11–12 years old[2]), attending the six second-grade classes at the school "Luigi Valli," in Narni, Italy. They are the almost totality of those who will be adults in 2020, a symbolic deadline for European Union energy strategy. This age

Figure 1. Localization of Narni and Umbria in Italy.

span was chosen to avoid puzzling students who are to undergo more structured teaching on energy issues during their last year of the first cycle in education.

Narni was chosen because of the close relationship between the community and energy issues. In particular, thanks to the early development of hydropower in 1892, Narni was one of the first Italian municipalities to autonomously produce and manage electricity (http://www.paesnarni.net/storia-breve-dellenergia-a-narni-di-g-fortunati/). Such a positive relationship is still there today, and Narni is at the forefront in terms of renewable energy technologies. Besides the old hydroelectric plants, which are still active, the municipality has recently built a large biodigester plant (located in the industrial zone of Narni) and numerous solar/photovoltaic power plants, spread throughout the territory (installed capacity of approximately 44 Mega Watt peak). Thanks to their commitment, in 2012 Narni won the Solar Championship promoted by Legambiente (the Italian League for the Environment). Moreover, the municipality has recently joined the Covenant of Mayors and has defined an Action Plan for Sustainable Energy (PAES).

Procedure

The photovoice procedure was slightly adapted to fit the school setting and the age of participants. Activities were conducted at school during the school year 2013–2014 (from mid-September to mid-June). Participants were invited "to join a challenge, and to capture the invisible" and "to produce images depicting their own idea of sustainable energy." The activities were articulated in three phases:

(1) Subjective production of images (December 2013–February 2014): Pupils were invited to individually produce one to three visual

representations of their own idea of sustainable energy. We deviated from the original procedure to be inclusive and enhance their creativity, and we accepted collages, drawings, and downloaded images. We also asked them to briefly comment on each image in an attempt to trigger small-group discussions.

(2) Photo-elicitation (December 2013–February 2014): Small-group discussions (7–12 participants) were organized in each class and were audio- and video-recorded. Those students who had chosen not to produce any images in phase one were included in these groups. In each group, two researchers facilitated discussions. First, each participant was asked to show to his or her classmates the picture he or she had produced and to explain the idea behind it. Then, to explore the naming and classification processes, which are at the basis of anchoring in SRT, and to foster the communicative exchange, we added some tasks that are not present in the original procedure; for example, pupils were involved in a group-sorting task and asked to cluster images that were similar according to them, to explicit grouping criteria, and to provide definitions of sustainable energy accordingly. Group-sorting task was replicated several times: after reaching an agreement on definitions, participants were invited to discuss whether it was possible to reorganize images according to different criteria and to provide alternative definitions of sustainable energy. Small-group discussions lasted about 90 minutes. In the end, representatives of each group had to illustrate the main aspects of their group to the other pupils, and the entire class was engaged in a 30-minute group discussion.

(3) Public communication of the results (May 2014). We decided to put the classes into two large groups. Although this event could not be open to the rest of the community, as the original procedure would require, two local administrators were present (i.e., the Municipal Councilor for the Environment and the Municipal Councilor for Culture). Researchers reorganized and illustrated images and the outcomes of group discussions. Students were engaged in plenary discussions, where they could express their ideas and requests and offer concrete proposals to local administrators.

Data analysis

Images (N = 133) were submitted to content analysis inspired by polytextual thematic analysis for visual data (Gleeson 2011). This analysis allows the identification of recurring patterns, both in terms of forms and contents, and recurrent themes (Gleeson 2011). The analysis focused on explicit contents and structural features and was based on a grid developed during previous research (Sarrica et al. 2015). Two independent judges conducted data analysis. In the rare cases of

disagreement on coding, the photo was reanalyzed together and the consensus was reached. The final grid includes the following categories:

- *Location*–setting (wild, rural, urban, industrial, or a combination);
- *Production technology*–presence (presence, absence);
- Type of energy produced (solar, wind, geothermal, hydro, biomass, marine, nuclear, fossil, or a mix);
- Scale (small-scale, such as a single solar panel, or large-scale, such as large solar power plants);
- *Consumption devices*–presence (presence, absence);
- Type of energy used (fossil, electric, muscular);
- Level of sustainability (high, low);
- *Human beings* and *animals*–presence (presence, absence);
- Quantity; and
- Main characteristics.

Following the content analysis, a qualitative assessment of the co-existence of different sets of iconic images was performed and used in the interpretation of results to compare the outcomes of photovoice with results obtained by visuals and texts collected at the societal level in previous studies (De Rosa & Schurmans 1990; Gleeson 2011; Sarrica et al. 2015; Smith & Joffe 2013). The research team qualitatively processed notes and digital recordings of small-group discussions and class discussions focusing on the following questions.

Definition and core elements of the representations

Did alternative images emerge in participants' verbal account of sustainable energy? What definition do they provide? Which elements did participants consider as essential for energy to be sustainable? And, in contrast, which elements had to be missing?

Grouping criteria

How did participants group images in sorting tasks? Which criteria did they use first? Which other criteria emerged during the discussion?

Interactional level

Which features were the most negotiated and debated; in contrast, which were the most shared and unanimous? How were polysemic and consensual features of images used in discussions? Did any communicative mode prevail in the discussions?

Relevant parts were transcribed by the research team and a selection of the most representative excerpts, which were in Italian, were translated in English by the authors of this article.

Notes of the final event (phase three) were also considered in order to integrate previous analysis and identify new and unexpected contents and interpretations.

Results

Figurative components and definitions

The analysis of photos produced by participants in the first step of the photovoice activity gives interesting insights into how sustainable energy is objectified and reduced to a few images that constitute the figurative nuclei shared by our participants. Elements included or excluded from the photos provide cues about young participants' socialization to representations shared at the societal level.

Photos and drawings that focus on energy production processes are over-represented in our convenience sample (n = 110, 82.7%). Images related to consumption (i.e., sustainable devices and practices) are underrepresented (n = 29, 21.8%[3]). As in previous studies, large-scale production sites (n = 75, 54.9%) are more frequent than small-scale ones (n = 31, 28.4%) and mixed examples (n = 3, 2.8%). Technologies in photos and drawings mainly include solar panels (n = 40, 34.5%) and wind turbines (n = 35, 30.2%); hydroelectric (n = 9, 7.8%), biomass (n = 7, 6.0%), and geothermic (n = 1, 0.9%) plants are less present. Concerning wind turbines, it is worth noting they are not present in the area. In fact, participants downloaded pictures from the Internet, made drawings, and in some cases found photographs shot during trips they took in other Italian regions. On the contrary, the biodigester and the old hydroelectric plants, which characterize the territory, were almost absent in the images. The few photos of biomass and hydroelectric plants were provided by participants who live close to the plants or who had members of their family involved in their building at the end of the 19th century.

Our participants mainly use wild (n = 90, 67.7%) scenarios as locations for illustrating production technologies. Though less frequent, rural areas are also present (n = 21, 15.8%). Typical examples include wind turbines on the tops of hills or solar panels in agricultural areas (Figure 2).

People are present in only three images (2.3%). However, technologies are less located in urban (n = 21, 15.8%) and industrial (n = 12, 9.0%) settings than could be expected. As in previous research, a number of photos and drawings (n = 19, 14.3%) points out human dimensions of energy using metaphorical images. Typical examples depict sustainable energy as "green electricity" that benefits the environment in which home is included; "energy for the planet" in which individual choices affect the whole planet; and "energy sustained by human beings" in which human responsibility is evoked together with the idea of offering a gift, maybe to next generations (Figure 3).

Figure 2. Examples of images: Ecocentric and technocentric contents.

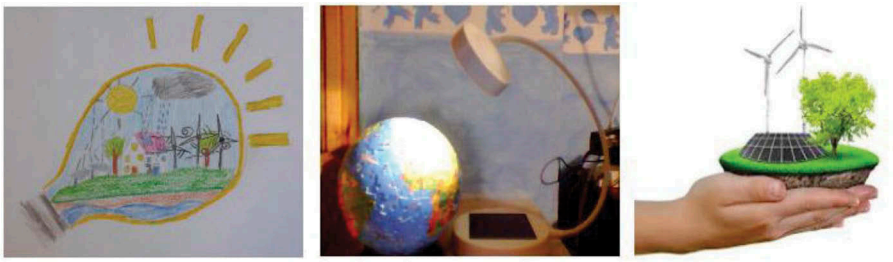

Figure 3. Examples of images: Metaphorical contents.

The combination of visual and verbal data provides further support for identifying possible core elements of the representation and to the anchoring of sustainable energy to other structures of knowledge, such as natural resources, pollution, nature, and territory. Verbal data, in particular definitions, also show the prevalence of production technologies blended with concerns for the environment. Participants' definitions of sustainable energy include:

> "Energy that does not produce toxic waste, that does not pollute";
>
> "Energy that benefits to nature, that can be produced from natural resources";
>
> "Energy that is self-sustaining, that produces, and that is infinite"; and
>
> "Energy that does not disturb the environment, that protects the territory."

Consumption and the human perspective emerge only in one shared definition: "Energy that allows us to save money." However, as we will see next, the discussion showed that the human perspective is much more complex than this, for our 12 years-old participants.

Grouping criteria and interactional level

The group-sorting tasks and the group discussions gave access to the interactional level and to the microgenesis of SRs. We could observe how images are used in communicative exchanges to reaffirm consensus about the essence of sustainable energy or to transform its representations.

Participants first focused on the shared referential aspects of images and clustered them according to *Source-Technologies* (e.g., sun-solar panels, wind-turbines) and *Location* (i.e., wild, rural, urban, or industrial setting). The same criteria identified by the analysis of photos were thus spontaneously evoked and shared in interactions among participants.

Images were then grouped according to the phase of the *Energy process* they conventionally depict: production, distribution, and consumption. This latter criterion for classification was, however, less evident and more challenging; polysemic contents in particular emerged in discussing the now mixed use of rural areas (for agriculture or energy) and the role of households (as producers or consumers).

In this phase, photovoice gave us the possibility to foster and observe the microgenetic process. In order to solve group disagreement, participants were asked to engage in negotiations that gradually transformed and expanded the contents of the representations. In debates, early adolescents reframed sustainability according to the basic opposition "good-evil" and further segmented it into three main categories: size, place, and rights.

Which size is better?

Despite the prevalence of large-scale power plants in the visual data and in the first definitions provided, during group discussions young citizens realized that large-scale plants may have a negative impact on agriculture, landscape, and the restorative capacity of nature (e.g., the noise of turbines, the smell of biodigester). Real conflict rarely emerged during the group discussions of this issue; communication was often limited to simple individual statements and group members expressed compliance:

> (Pupil_A_{21}[4]) "When walking there [close to the bio-digester], oh my goodness, how it stinks." (Pupil_B_{21}) "You have to plug your nose." (Class_2, Group_1)
>
> (C_{21}) "Concerning hydropower, there is no freedom for nature." (D_{21}) "And animals, such as fish, are trapped inside and suffer." (Class_2, Group_1)
>
> (A_{41}) "If wind turbines are placed on hills, there is a risk for deforestation." (Class_4, Group_1)
>
> (A_{31}) "There is a wood, they have cut all the trees and put solar panels. . . I do not like it very much because nature was much more beautiful." (Class_3, Group_1)

Cognitive conflicts were apparent on a few occasions, sometimes leading to the participants taking into account alternative needs:

> (A_{51}) "On the other side, it is also true that a city cannot work with just one wind turbine, therefore more and more wind turbines would be needed and they would not look very good." (Class_5, Group_1)

Which place is better?

This second question emerged spontaneously in all groups and led participants to reconsider the strict correlation between production technologies and wild and rural locations. Conflicts were more evident when the location of renewables was at stake. Young citizens referred to their personal experience and introduced a distinction between usable space (e.g., arable fields) and unusable space (e.g., parking lots, roofs of factories or houses). The latter should be used to benefit the entire community.

(A_{12}) "The dam occupies space." (B_{12}) "No, it does not; it does not occupy usable space." (Class_1, Group_2)

(C_{12}) "A field filled with solar panels occupies space." (D_{12}) "But solar panels on rooftops do not." (E_{12}) "Concerning solar panels, only one panel does not occupy space, an entire field filled with them does." (F_{12}) "Arable fields are in uninhabited places, such as abandoned fields, which are used for that purpose, or close to busy roads, where there is so much smog… then, in those cases, solar panels occupy unusable space." (Class_1, Group_2)

(G_{12}) "Wind turbines in the sea occupy unusable space." (H_{12}) "But those [wind turbines], which are not in the sea, do." (Class_1, Group_2)

(E_{21}) "I do not like solar panels on the ground, they are useful, but they occupy space that could be used in other ways." (F_{21}) "I agree with her, they do not look good; on the contrary, I like solar panels on rooftops." (G_{21}) "In parking lots, as well. They are useful because they do not occupy space." (Class_2, Group_1)

(B_{51}) "There are even solar panels close to the cemetery, with several fields all around; they have filled everywhere with solar panels… it is ugly." (Class_5, Group_1)

Who benefits from renewables?

The first two questions related to size and place, respectively, were discussed by participants in terms of the benefits that sustainable energy brings to the environment and to people. All groups reflected on this issue and discussed again the meanings of photos already considered. Typical examples of the reconsidered photos included many solar panels in agricultural areas versus a few solar panels on rooftops (Figure 4).

In Class_3, Group_1 and in Class_2, Group_2, it is often the same individual who present alternative views on the topic.

(B_{31}) "[Solar panels] On the ground they are placed for the entire surrounding area; on the contrary, on rooftops, you can place two or three solar panels and only for that house." (C_{31}) "It would be better to place them on rooftops rather than ruin nature." (Class_3, Group_1)

(A_{22}) "Solar panels on the ground give energy to a wider area; on the contrary, those on rooftops only give energy to one house." (Class_2, Group_2)

Figure 4. Examples of images: Who benefits from solar panels on the ground or on the rooftops?

In the remaining groups, the potential conflict among environmental, individual, and social dimensions of sustainable energy is more evident, and many members of the group intervene in the discussions.

> (B_{41}) "Solar panels in rural environments ruin the landscape." (C_{41}) "They modify the environment." (D_{41}) "From natural, it becomes artificial." (E_{41}) "The human presence is evident." (F_{41}) "They occupy a lot of space and steal space to agriculture." (B_{41}) "There are both pros and cons… they are an advantage because they produce energy, but they are a disadvantage for the environment." (Class_4, Group_1)

> (C_{51}) "Fields can be used for agriculture; on the contrary, they [solar panels] do not ruin the landscape in cities and on rooftops." (D_{51}) "But, on rooftops, they give energy only to the house; on the contrary, if they were in fields everyone could use its energy." (E_{51}) "No, they ruin the environment and occupy space." (F_{51}) "But they produce more energy if they are placed in fields." (Class_5, Group_1)

> (A_{62}) "[Solar panels are] Better in fields." (B_{62}) "Yes, in fields, because they distribute energy to an entire town." (C_{62}) "But, on rooftops, solar panels do not occupy fields aimed at agriculture." (D_{62}) "And, on rooftops, you can cut costs for those who live in that house as well." (Class_6, Group_2)

Participants belonging to the more conflictual groups (both Group_1 and Group_2 of Class_4, Class_5, Class_6) were brought by the discussions to consider new dimensions of sustainability that challenge the initially shared preference for nature over technology.

> (A_{42}) "It [energy] should be distributed in a fair way." (Class_4, Group_2)

> (E_{62}) "[Solar panels] In fields they are ugly." (F_{62}) "But you do the right thing and give energy to those who are close to you." (Class_6, Group_2)

> (A_{61}) "Close to his house there is a field filled with solar panels, maybe owned by the Municipality; earlier, during summer, there were sunflowers." (B_{61}) "I preferred it before, it was more integrated with the environment." (A_{61}) "Well, I would be glad because solar panels bring energy into houses." (C_{61}) "And sunflowers were so high that nobody could even walk there; on the contrary, now it is used." (Class_6, Group_1)

As an outcome of the search for epistemic/constructivist solutions of the conflict among the environmental, individual, and social dimensions of sustainability, the community level, which was not considered at the beginning, gradually became an emerging feature for all small groups. Participants anchor sustainability to ideas such as fairness and usability, which were not evoked initially. Some of them even suggest a definition of sustainable energy as something that is for all, including people who cannot afford to bear the costs of installing solar panels on the roofs of their house.

Conclusion

The current study, which integrates previous research conducted in Italy on SRs of sustainable energy (Brondi et al. 2014; 2016; Sarrica, Brondi & Cottone 2014; Sarrica et al. 2015), explored the use of photovoice (Wang 2006; Wang & Burris 1997) with young citizens in the field of energy transition. Our hypothesis was that this participatory action-research strategy could help investigate figurative components of SRs and could highlight the processes that contribute to their co-construction (i.e., anchoring and objectification), to individual socialization (ontogenetic process), and to their transformation (microgenetic process). Results were consistent with these expectations.

Photovoice helped us to collect rich visual and textual data showing that young participants, ages 11–12, are used to the representations shared at the societal level. Shared contents were identified through polytextual thematic analysis, which proved to be useful in guiding an analytic examination of the elements present in the photos. Drawing on previous research, we may interpret the ways they were composed into the blending of two recurrent patterns: technocentric and ecocentric contents (Brondi et al. 2014; Brondi et al. 2016; Devine-Wright & Devine-Wright 2009; Sarrica, Brondi & Cottone 2014; Sarrica et al. 2015). Images of large wind and solar power plants located in rural and wild areas are the shared figurative nucleus of the representation. A further set of images, which mainly include metaphors, corresponds to what was identified as a potentially challenging anthropocentric figurative nucleus (Sarrica et al. 2015).

Small-group discussions provided further insights into the microgenetic processes that contribute to "the making" of SRs. Participants first grouped images according to two criteria: technologies and location. By doing so, they focused on the referential and conventional aspects of photographs and expressed their will to reaffirm an already shared understanding. As expected, small-group discussions envisaged by photovoice were useful to allow the participants freedom to explore alternative criteria and to foster negotiations of alternative meanings which were initially hidden to the participants and to the researchers (Caillaud & Kalampalikis 2013). Despite a thorough analysis of the interactions in the group discussions goes beyond the scope of this article, overall, results showed that photovoice technique

gives access to the direct observation of meaning-making processes which are often invoked in SRT (Flick, Foster & Caillaud 2015). Preliminarily interpretations of the results may be viewed as the opposition between two main communicative formats, which correspond to alternative solutions of sociocognitive conflicts. On the one hand, participants seemed to avoid the emergence of conflict or to solve it through compliance. They showed a tendency toward the reification of formats and uniformity (Bauer, Gaskell & Allum 2000; Wagner et al. 1999); that is, they used one-sided arguments and preferred to communicate with others of similar opinions and select contents that were assumed as shared instead of challenging opposite ideas (Batel & Castro 2009; Wagner & Hayes 2005). On the other hand, young participants were not passive recipients at all. Rather they actively negotiated meanings which were available at cultural and contextual levels (Castro 2015; Duveen 1993; Moscovici & Marková 2000). A consensualization format was used in small-group discussions, namely, a common quest for agreement within the group and negotiation among the different views expressed (Castro 2015). Consensualization "has a more clear potential for achieving dialogical understandings," it accepts heterogeneity of representations and actions, and "is expressed in arguments revealing awareness of the fact that representational fields are multiple and hybrid" (Batel & Castro 2009, p. 419). This format is especially used when potentially disruptive elements for the community are at stake: in our case, the use of space and the distinction between those who can and those who cannot employ the new technologies. The polysemy of images contributed to foster discussions on these new issues that could not be solved through previously shared criteria. As a result, participants engaged in negotiations and debates on places and rights as well as developed new anchoring of sustainable energy to ideas that were salient in the local community and that aimed at the broader topic of energy justice (Sovacool 2014).

The results of the current study show the potentialities of photovoice as a means to explore the contents and processes of SRs. However, the exploratory nature may have limited the current study in identifying the communicative processes activated by photovoice, and further research is needed to examine the use of photovoice in greater detail. As already noted, the analysis we chose focused on explicit contents and aimed at analytical clarity. However, much more could be said about each photograph by following different paths of analysis. In particular, a second-order semiological analysis could be added to thematic analysis as a further step to deepen (at least with a subset of images) the paradigmatic and syntagmatic relations among signs and to provide thick interpretations of the myths and ideologies behind apparently natural photos (Penn 2011). More structured forms of triangulation between visual and verbal data should also be considered in future to deepen ontogenetic and sociogenetic processes as well as to examine individual and group positioning. Microgenetic processes could be examined in further detail, taking into account monological/dialogical communication or the use of themata (Jovchelovitch 2007; Markova

2003; Markova 2008). Further insights could also come from more detailed analysis of focus group interactions (Caillaud & Kalampalikis 2013; Halkier 2010). The participants' characteristics also make the current study limited in scope: we worked with early adolescents, but further research is needed to explore how the proposed technique should be adapted to be successfully employed with younger participants. Last, photovoice could actually benefit from further in-depth analyses of communication processes between participants and the larger community (Caillaud 2016). In this regard, although they were not directly assessed, applicative outcomes of photovoice activities emerged. Our participants reported that during the project they were keener to notice the presence of renewable energy plants in the areas in which they live, and declared having engaged significant adults (i.e. parents and relatives) in discussions about the project and about sustainable energy. Moreover, in the final presentation of the activity to the local policymakers, pupils engaged in plenary discussion and actively provided concrete suggestions. As a result, their reflections on the use of public spaces, social sustainability and distributed production of energy by renewable energy sources have become objects of further local initiatives and were taken into consideration within the recent Action Plan for Sustainable Energy (PAES) of the Municipality of Narni.

Despite these limitations, the potentialities of photovoice for research on SRs are encouraging. Photovoice heuristic potential and serendipity make this research strategy extremely effective to examine processes and components of SRs, to give voice to young citizens, and to engage them in participatory action initiatives aimed at raising environmental awareness.

Notes

1 Environmental consciousness can be conceived as a multidimensional psychological construct, which includes environment-related knowledge, direct and vicarious experiences, awareness, concerns, and values (Sarrica et al. 2016a).
2 Due to the age of participants, ethical issues were carefully considered and all the necessary authorizations were obtained before going into classes. All activities were conducted with teachers.
3 The percentages may exceed 100 because each image could contain elements related to both production and consumption.
4 Letters (A, B, C, etc.) indicate different participants of each group; the two subscript numbers identify the Class and the Group respectively.

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