

Social Objects in Sub-Saharan Africa and Child Development

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Abstract: *This research studies the influence of the relationship to objects on personal development. Here, we are interested in the impact of the relationship to water on the subjectification or subjective development of children in rural sub-Saharan Africa. We argue that the involvement of adults close to children (significant adults) around objects will transform these objects. These objects will no longer be isolated objects but will be more capable of supporting the personal development of these children. These objects will be referred to here, with emphasis, as "social objects". Through the establishment of three types of social involvement ("natural", concerted and persistent) around our object (water), we will artificially construct three types of social objects that will refer to three different situations of relationship to water. The main results show that the situation of the so-called concerted relationship to water is more conducive to the subjectification of rural children in sub-Saharan Africa. The relevance of a "natural" relation to an object for the personal development of children will be discussed.*

Keywords: African children, Sub-Saharan, Water, Subjectification, Objectivation, Social object

1. Introduction

Here we deal with the personal development of children in sub-Saharan Africa. We approach this development from the concept of subjectification. For Malrieu [1], subjectification is the process by which an individual produces his subjective uniqueness with the realities of his environment. This relationship must be considered as a socio-historical relationship in which human beings create objects or facts and, in doing so, reproduce themselves [1]. From this perspective, from social constructivism [2], [3], by producing their frames of existence, men are led to productions that determine them [4]–[6]. Work in sociology and psychology has, on several occasions, highlighted the role of inter-individual relationships in the development of individuals [7]–[10]. That said, we propose here to start from the alternative of objectivation [11], to better grasp the complexity of the process by which children produce their subjective uniqueness. Our approach will attempt to show the material and concrete basis of inter-individual relations themselves. In the context of children in sub-Saharan Africa, and the context of water as a social object, we shall examine forms of water that are more conducive to children's development. Inter-individual relations are already a complex outcome, and, especially in the case of underprivileged living environments [12], [13], it would be appropriate to be able to restore their proponents as well.

2. Subjectification and Objectivation

Following the work of Meyerson [11], [14], Malrieu sees the process of subjectification as being: "the set of activities by which the subject selectively appropriates the attitudes, representations and values presented to him as possible by the beings in his environment" [15]. The definition begins here by situating the subject in his environment and makes it

possible to conceive of his subjective development in relation to something other than himself. Then, in this report, Malrieu mentions the beings of the environment. The question to be explored further is then to know how best to grasp the reality of the beings of the environment. Would it be beings like other people or "Ego-Alter" [16] where the subject could be considered only in relation to other subjects? Or would it be more appropriate to see environmental beings as all realities of the environment, including objects such as water, air and various components of a global setting [17]? The second alternative seems to be one that allows for in-depth reflection on the relationship between the subjects and the children and their environment. This path is the alternative perspective of the relationship to the objects we are advancing. We propose a conception of objects in which they are no longer conceived in themselves. The environment is then grasped as a global context including both interpersonal relations and all materials in an ecological [18], universal [19], or comprehensive objectivation perspective [20]. Seize the complexity of children's relationship to their environment, make it preferable to consider the relationship to social objects rather than immediately the relationship to other subjects. Shortening this relationship to others mainly runs the risk of overlooking and simplifying the reality on which the relationship to others itself is based. Subject-to-subject relationships and models of intersubjectivity often revert to simple elaborations that should be addressed to restore more developed meanings [21]. The relation to objects, whose features need to be clarified, might thus constitute another entry point into the question of the relationship to others and subjectification.

2.1 Objects as social objects

We call objects anything that can be used, regardless of material considerations. Meyerson [22] said, in this regard, that there is no thought without material support. Still, in the extension of the principle, it is the thought itself, this subjective and immaterial idea that becomes eligible for material reality [23]–[25]. To illustrate this principle in an example of the simplest think of the knot in the handkerchief that makes it possible, as a mnemonic means, to materialize an idea so as not to forget it [26], [27]. Here, the idea is materialized from at least two points of view that are hardly mutually exclusive but, on the contrary, superimpose and maintain each other.

- At the simple level, from an individual point of view: the handkerchief's knot has become a second external memory for the person who makes it.
- At a more complex and social level, the strategy itself has its history and has been passed on from generation to generation. As a result, whoever adopts it inherits a historical and social mnemonic strategy.

When we deal with a social object, we should always keep in mind an object that is inseparably historical and social, even when used individually. At first sight, objects refer to tangible elements of the environment. They are natural (water, wood, stone) or products of human hands (paper, hammer, canvas). It is a widespread conception that distinguishes between natural objects and artifacts. From an objectivation perspective, this distinction is no longer tenable [2], [14], [28], [29]. In a social environment, objects, whether natural or not, have always been marked by a relationship with individuals who use them - and thus objectify them - but find themselves both transformed and affected by the way they objectify them in historical time [30]–[32]. Consequently, in the social environment that is indispensable to human beings, we do not consider an object independently of its objectivation, of its intentional aim [11], [33], but also of the collective and historical development of that aim. All objects, from this point of view, become properly objects only in and through their objectivation. That is what we call social objects.

2.2 Process of objectivation and subjectification

In the first sense, objectivation occurs when an individual perceives an object and this perception is accompanied by a meaning given by the individual to the object [15], [28]. In practice, this is already fully effective as soon as an object is perceived. The most apparent form of objectivation is the use made of an object by an individual. In the second sense, objectivation is never the work of an isolated individual.

Let us recall that objectivation refers to a historical instrumental relationship to what we can use, be it a material object or a psychological instrument [26]. Thus, even the objectivation of a single child recapitulates a complicated process. In this historical and social process, the collective use of simple objects leads to the production of new, more complex objects. In the relationship to these, individuals, in turn, transform themselves and produce new objects and so on. What is critical to seize in the process of objectivation in order to grasp how the relation to objects is the same as the

relation to subjects is first of all this; in the particular link to an object, a historical connection to many objects is summarized. More, this individual relationship to the object itself contains the link to countless individuals, not only contemporary but also past, as well as their cumulative ingenuity. Insofar as subjectification as personal development is concerned, and even more so in the case of children, it is closely linked to the development of the conditions for social objectivation [3], [34]. Here it is not the child's personality that takes precedence, but the development of environmental and social conditions [35], [36]. The issue of subjectification is thus brought back to the study of socio-historical terms of subjective production.

Several frameworks can be offered for such an exercise, which would lead us to question the objective conditions of individual development. We propose to exercise this by asking the question of the subjectification of children in sub-Saharan Africa in their relationship to water as a social object. The question of their subjectification, posed with such an object, becomes that of the social reality of water likely, in their environment, to support their subjective development.

3. Children in sub-Saharan Africa and water as an object

Although this dimension is in line with our issue of the relationship of children in sub-Saharan Africa to water as a social object, we will not go as far as to take into account the polluting agents that can alter the quality of water. Studies address the issue with an increasing focus on developing countries [37]–[39]. However, there are still few studies that take these aspects into account in the context of African countries. Such a state of affairs is not without echoing the peripheral dynamics, in terms of means, equipment and autonomy of scientific research in the countries of the South, in which Africa is singularly anchored [40], [41]. We know of a few studies in this respect, which have nevertheless made it possible to give an overview of the seriousness of the situation in certain sub-Saharan African countries. Thus, the survey by Spiegel [42], dealing with the mercury pollution to which the gold mining inhabitants of the rural community of Rwamagasa in Tanzania are exposed. In the same study, the author mentions similar cases in Zimbabwe, other African countries and South Africa [43]. Our reflection on children's relationship to water, without ignoring these concerns and for reasons of feasibility, sets aside those aspects that would require water quality testing devices.

On the other hand, it focuses on children's use of water in such a way that children themselves can represent the quality of this object in their context. Three categories of determinations will enable us to establish the social forms of water, namely: the location of the lands, the social partners of the children and finally the children themselves.

3.1 Location of lands

Water will be an object spatially and geographically located. Our study areas are rural localities in three countries: Mauritania, Senegal and Togo. We have chosen them

located on the borders of watercourses. Mauritania, Senegal and respectively, the areas of Bogué and Bakel share more or less the same climatic conditions. These two localities are located on both sides of the Senegal River. Their Sahelo-Sudanese location makes them prey to climatic rigors typified by very high temperatures and low and irregular rainfall [44]–[46]. Togo will provide us with a more humid terrain, with the locality of Tomè, because it is located in tropical Africa. Due to its stretching, Togo presents a climatic diversity from coastal humidity to the Sahelian climate of the northern savannas [47], [48]. Due to the location of these lands, we have two Sahelian localizations with the localities of Bogué in Mauritania and Bakel in Senegal and one in a tropical climatic zone with the location of Tomè in Togo.

3.2 Children's social partners

We are interested here in the favored social partners of children; their closest relatives, to put it another way. These favored partners are not directly our subjects of study but, insofar as we are interested in the objectifications that children can achieve from an object in their environments, they become inevitable. They will embody cultural knowledge that children will be able to access in their task of using water. The challenge of objectification of water with which we will confront children cannot be conceived as simple. Indeed, children will not merely be expected to use water in their context, but to use it in a way that best supports their development. According to Malrieu's [15] definition, it is the fact that the child is constituted in relation to the beings in its environment that refers to the process of subjectification. It is then a matter of the children getting in touch with water to realize themselves as individuals better. Children's social partners will be essential in establishing such a relationship between children and the water of their environment.

3.3 Children themselves

The process by which children themselves achieve the production of their subjectivity is the problem we pose here. This does not mean, however, that the process in question should be reduced to the immediate fact of the children's activity. Children do act; they make choices, prove to be active in all situations concerning them, express their assent and disapproval in their relationship to others [9], [10], [49], [50]. However, concerning these children's activities traducing self-awareness and accompanying their subjectification, Wallon notes that they should be considered as a consequence rather than in principle of their development. This self-awareness will be above all the result of the "prolonged incapacities to which the child of man is condemned by the extreme slowness of his development, slowness moreover made possible by the institution of organized and helpful society" [9]. It is in this sense that we shall consider the children themselves here, in the sense that they become all the more themselves as an organized and supportive social framework allows them to do so.

4. Social Forms of Water

From a perspective of objectivation, as we have noted, one cannot conceive of any object that is not social. That is to say, in society, the isolated, abandoned object is still only abandoned concerning a social framework. The social forms of water will refer, in this study, to different situations of social organization or inorganization, at the end of which water will be presented as a real object to children in their living context.

4.1 Water as a "natural" social object

The first social form of water that we are going to experience is the one we present as "natural". Here we will consider water as an isolated object. We will act as if in order for the child to objectify water in such a way that it is beneficial to his development, it would be enough to put him as an individual subject in front of the water of his environment. We will confront the child alone with the diversity of the waters his milieu. He will then have to make use of the water as if it were independent of the actions of adults and the social environment. The production, even experimentally, of such a situation of objectivation is impossible. But here, proposing to create such a condition so that the child can objectify water, we have in mind only a minimal and reduced situation of social involvement.

4.2 Water as a concerted social object

We will implement a second situation where the child's relationship to water will include, in a more perceptible manner than in the previous case, social involvement. The child's relationship to water will not take the form of his individuality facing water reduced to itself and independent of social activities. It will include its capture by the adults disposing of it as a marked object of social practice. The complex reality of the social object is undoubtedly far from being reflected in the social concertation of an adult and a child around an object. But, even in this reduced and imperfect form, we think we could support our thesis on the developmental opportunity for the child of an object that includes social involvement in comparison with an object that has little to do with it. To implement this situation, we will propose this time to the child's significant adult to assist him in his task of objectivation.

4.3 Water as a persistent social object

We will implement here, in the final situation, the child's report to water as an object following the preceding interaction between him and the significant adult. Here, the child's approach to water will take the form of a relationship between the child and an object already marked by the adult's involvement. In this respect, although the child may seem to be alone in facing the object, he will find himself in a relationship that differs from the first condition where he was in front of a "natural" object. The object here, without referring to the concerted condition; that is of the second situation, will nevertheless retain a social form from the concertation that took place between him or her and the adult. At the end of which, water has become an object marked by social achievements with which the child will have to renew its relation. Here the child, even alone,

through the prior concertation, will embody a competence by which he is no longer so alone. That will be the last condition to be implemented. Subsequently, children's objectivation of water in this persistent social form will be compared with their other objectivation results. Specifically, the results of the persistent social form will be related to the results of the "natural" and concerted social form.

5. Materials and Methods

5.1 Participants

Our sample consists of 68 children from sub-Saharan Africa aged 4 to 7 years ($m = 5.78$; $\sigma = 0.789$). A total number of 55 adults close to the children (fathers, mothers, cousins, uncles, aunts, grandparents, etc.) will be able to assist them in the concerted situation of water objectivation in the study. This entire group of participants breaks down as follows; children in the Sahelian locality of Bogué in Mauritania ($N = 23$), from 4 to 7 years old ($m = 5.78$; $\sigma = 0.6$) accompanied by 22 significant adults. In this sub-group, we count 11 girls and 12 boys. Children from the Sahelian locality of Bakel in Senegal ($N = 23$) aged 4 to 7 years ($m = 5.57$; $\sigma = 0.896$) with 18 significant adults. Here we count 15 girls and 8 boys. Finally, we have the last group of children from the locality of Tomè in Togo ($N = 22$) aged 4 to 7 years ($m = 6$; $\sigma = 0.816$) accompanied by 15 significant adults. There are 16 girls and 6 boys in this sub-sample. Our group of children from sub-Saharan Africa is thus composed of 42 girls ($m = 5.81$; $\sigma = 0.833$) and 26 boys ($m = 5.73$; $\sigma = 0.724$). The slightly lower number of adults compared to the number of children is explained by the fact that some adults were adult respondents for several children.

5.2 Instruments

We will use two types of tools to collect our data: a semi-directive interview guide for significant others who will

assist the children and figurative boards that will be our objectivation boards.

5.2.1 Semi-directive interview

Semi-directive interviews are one of the most suitable methods that we could use because of the specific nature of our rural areas and the highly variable realities of the lives of the people we would meet. Several exploratory interviews in rural areas prepared us to work with a population with a few particularities. This population is not very accustomed to the frameworks of the research process. It presents living conditions full of opportunities and events that can redefine the daily schedule at any time. The advantage of the interview method was that, by approaching the classic form of discussion, it rendered our approach of questioning them about water uses less strange. Then, in such a context where many of the journeys are made on foot, we needed a research device that would allow us to be mobile and adapted to the diversity of the unexpected that we might encounter. In these respects, the semi-directive interview was a tool of choice for us because of its maniability. The interview guide included four main questions addressed to the adults about their water practices and what they thought about the water uses of children and their child(ren) in particular. These questions were as follows:

- 1- *What are the various means you use to get water?*
- 2- *Can children also access these means?*
- 3- *Have you ever travelled great distances to get water?*
- 4- *How do you see the way children use water?*

In addition to these leading questions, there were other related questions that, in the exchange with the adult, clarified something that he or she had said or introduced a new element related to his or her point and on which we wanted the adult to comment. *Table 1* below presents our main questions and some related questions that we were able to ask significant adults just before the first stage of interaction with the associated child(ren).

Table 1: Summary table of the interview guide

Leading questions (L.Q.)	<i>What are the various means you use to get water?</i>
Related Questions (R.Q.)	- What other means do you use to get water? - Do you go to the well to get water? - Why would you choose the tap? - Why do you prefer river water to well water?
L.Q.	<i>Can children also access these means?</i>
R.Q.	- Do the children go to the tap to serve themselves, or do you go and get water for them? - Can it happen that they go to the river? - If the children want to drink water, for example, how do they do it? - Can children go to the well, the river or the tap to get water?
L.Q.	<i>Have you ever travelled great distances to get water?</i>
R.Q.	- That never happened? - When it's hot, the well in the garden still has water, while the one nearby can dry out? - Does the distance seem long to you? - There is no need to go further to fetch water?
L.Q.	<i>How do you see the way children use water?</i>
R.Q.	- Are they not wasting it? - Isn't that what they're playing? - How do children play with water? - Can I ask you for an example of good and bad uses they make of the water?

5.2.2 Objectivation boards

We made figurative boards depicting water uses. We will use these boards as a support for children and adults to use water as an instrument [51]. This instrumentation, which visualizes usages, thus objectivation of water, will be done according to the pictorial situations presented on the boards. These boards will also be used to visualize the quality of the water. We

have adopted a color code which has made it possible. The instrumentation of the water that will be discussed will consist in a task of assigning to water - thanks to the color code -, the place or source from which water should come from to better suit the job represented on the board, according to the child tested. These water scenes are familiar and recurrent on our study grounds. They were made from

water scenes we observed in Bogué, Mauritania. We had no difficulty using the same boards in Senegal. We will note errors in identifying the contents of the boards among children in Togo, when the boards featured animals unfamiliar to children in tropical Africa. These errors will not affect the children's choices about how to objectify water. We have classified our boards into three divisions:

- In the first division (see *Figure 1*), we have classified the boards according to whether the objectivation of water is of vital importance to the child. These will be the so-called **Vitals** boards from which objectivation will be associated with scores of greater importance. The objectivation of water to these boards could have a direct (immediate) or indirect (media) effect on the child's development depending on the way the child will objectify water on these boards. In the case the child will drink the water, the effect of such objectivation will be seen as immediately conducive or not conducive to his or her development depending on the quality of the water chosen for the board. In the case where the child will use the water to irrigate a plant, for example, the effect of such objectivation will be seen as indirectly favorable or unfavorable to his or her development, again depending on the quality of the water chosen for the board.



Figure 1: Example of **vital** objectivation boards: respectively with a direct effect on the child (immediate) and an indirect effect (media) on the child.

- In a second division (see *Figure 2*), we have classified boards where the use of water is not necessarily of vital importance but is otherwise beneficial to the child. We have identified these boards as **Utilitarian** to refer to an application that is different from vital boards. The objectivation associated with these boards will have scores of medium importance. Objectivation to the utilitarian boards will also be considered with respect to immediate or mediated effects on the child. A utility board with an immediate effect on the child could be a scene depicting a domestic task of storing water or a cooking task, and a utility board with a media effect could be a scene where animals are seen drinking.

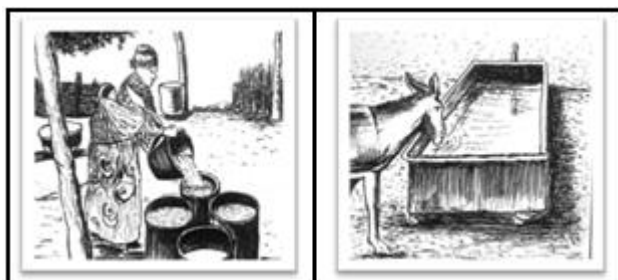


Figure 2: Example of **utilitarian** objectivation boards: respectively with direct effect for the child (immediate) and indirect effect (media) on the child.

- In a final division (see *Figure 3*) we have classified other boards that present situations of water objectivation of a playful or no less utilitarian nature than in previous uses but which may, in the case of difficult access to water, be postponed. These uses, in our environments, could be less imperative than drinking or having a reserve of water at home for domestic needs. These boards will be grouped under the division of other and recreational uses of water. To simplify, we referred to it as the **Playful** division. The water objectivation related to this division will have the lowest scores. We will also distinguish here the objectivations that could have an immediate or mediated effect on the child.



Figure 3: Example of **playful** objectivation boards: respectively with direct effect on the child (immediate) and indirect effect (media) on the child.

We present here two of the six tables of each division (**Vital**, **Utilitarian** and **Playful**). The tool consisted of three sets of assemblies of six boards, bringing together, as above, two boards from each division. Out of the 18 boards, we created three notebooks for three handover sessions, each of which brings together, in variable order, two boards presenting situations of **Vital**, **Utilitarian** and **Playful** objectivation [51]. Each of the two boards in each division will be in two parts: one with a direct effect and one with an indirect effect on the child's development. The objectivations of children directly favorable to their development will be called objectivations with immediate effect. We will speak of "immediate objectivation" (**Im. O.**). The objectivations of children that are indirectly favorable to their development will be called objectivations with effects through mediation. We will speak of "objectivation of mediation" (**O.de M.**). Concerning the time that should elapse between each session, we had initially set it at one week, but we will, unfortunately, be forced to reduce it to 3 days on Senegalese and Togolese grounds. This will be one of the flaws of our study; the time spent from one working session to another will not be the same for all children.

5.2.3 Principles for scoring objectivation boards

We have rated the boards according to the principles adopted for the classification of figurative representations into **Vital**, **Utilitarian** and **Playful** divisions. These principles also take into account the color used by the child on the various objectivation boards. Each of the figurative boards of the tool can be seen as a mini-test to which the

answer provided by the child's color assignment is either appropriate or inappropriate for the figurative scene presented.

- 1) We considered as correct answers the attribution of blue or similar color - symbolizing first quality water - to all the immediate objectivation boards (**Im. O.**). Equally, we considered as correct the attribution of brown or similar color - symbolizing second quality water such as river water, rainwater -, to all the objectivation of mediation boards (**O.de M.**).
- 2) We distinguished the water objectivations according to their specific types within the *Vital*, *Utilitarian* and *Playful* divisions. The Vital objectivation boards were rated for 10 points. The Utilitarian objectivation boards were rated for 4 points. The Playful objectivation boards were rated for 2 points. These scores were attributed according to the divisions and no matter the immediate objectivation (**Im. O.**) or the objectivation of mediation (**O.de M.**).
- 3) We only awarded points for the immediate objectivation boards (**Im. O.**) if the child on these boards used "blue water", i.e., if he colored the water figured in blue or in color in line with the representation consisting in identifying the blue color with that of first quality water. We would not award points if the rule were not followed. Similarly, we only award points for the objectivation of mediation (**O.de M.**) if the child on these boards used "brown water" in a manner consistent with the representation of identifying the color brown with second quality water. Here too we would not allocate points if the rule had not been followed.

From these scoring principles, we derived some simple rules from which we would interpret our objectivation scores.

- The maximum objectivation scores allowed by the tool are 16 points per pass with a minimum of 0, for both (**Im. O.**) and (**O.de M.**) scores.
- The higher an Objectivation score, the more significant it should be of the potential for subjectification of children in their relationship to water in their context and vice versa.

5.2.4 The front page (1st and 2nd round)

Working sessions with the children around the objectivation boards took place in three stages. The first session of water as a "natural" social object, as well as the second of water as a concerted social object was preceded by preliminary work on a front page (see *Figure 4*). This work was intended to help the children take ownership of a tool which, even when made for them, could present some difficulties in terms of appropriation. Indeed, for these children living in rural areas, the practice of coloring, an approach that favors pictorial representations of water and the association of colors with an object often perceived as transparent did not make the tool, despite the efforts, we devoted to it, easy to appropriate. The frontispiece board was used to introduce the children to these principles, thus facilitating the adoption of an instruction, which will make it possible to follow their objectivations. It will only be used in the first and second rounds. The work to be done on the front board consisted, once the board was in front of the children, in presenting them with twelve colored

pencils, including blue, yellow and brown pencils, and in reading and explaining the annotated instructions. Thus, we accompanied the children in the presentation of the photos, the choice of the corresponding colors, the coloring of the drawing boxes, the answer to the question of preference and if the child was able to do so, in the explanation of his choice of color. The same work was repeated in the second session, with the possibility of the intervention of a significant other.

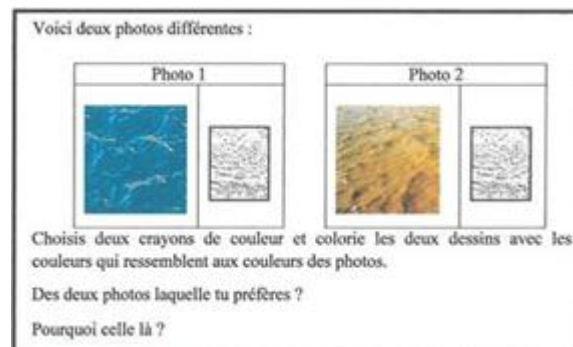


Figure 4: Front sheet of water color selection for first and second round.

6. Proceedings

6.1 Objectivation boards in the first round: "natural" social form

After the frontispiece board exercise, we made the child visualize all the boards in the notebook by asking him to describe them to us. If he couldn't describe the contents of one board, we would move on to the next and tell him we could come back to it. When the answers given to the questions on the front page, or to some of the descriptions on the first pages were not satisfactory, we would come back to see if the child had a better grasp of the previously misinterpreted content. Finally, we would give him/her the instruction by explaining beforehand that photo 1 represented clean water, while photo 2 represented water like river water that could not be used for all purposes. We reminded him of the colors he had previously chosen to indicate each of the waters, we indicated that in all the plates viewed, we were talking about water, and then we specified the task of coloring the waters, depending on whether he thought that clean water from photo 1 or troubled water from photo 2 should be used for each of the plates. We made sure that after each colored board, the child put down his colored pencil before moving on to the next board. This involved the session administrator handling the handover notebook as the child was progressing.

6.2 Objectivation boards in the second round: concerted social form

The procedure was similar to that of the first session, except that the child was no longer alone but accompanied by a significant adult. We explained to the adult that he or she could assist the child in the choice of colors for the photos on the front page, in answering the various questions we would ask the child and at any time during the handover. Furthermore, we specify to the child that the adult will assist

him or her during the task and that he or she may ask for this assistance at any time during the test.

6.3 Objectivation boards in the last round: persistent social form

We found the child alone during this session. As the third notebook did not have a front page, we asked the child if he remembered the colored pencils he had used in the first or second stage of the handover. If the answer was yes, we asked him to take the colored pencils in question and to show us the pen he used for clean water, as well as the one he used for troubled or river water. Sometimes the child got the colors wrong or reversed them. In this case, our intervention was limited to asking him if he was sure that he had not made a mistake and if he wanted to change the pencils that he indicated. This was sufficient to correct these errors in several cases. If he nevertheless maintained his choice, we would let him do so, and we would continue. These cases occurred twice with children in Bakel. Because of their choices in previous sessions and the consistency of the color distributions, we maintained their choices and rated them according to the meaning they gave to the colors.

7. Results

The results presented in this study are part of a larger research project undertaken as the basis of a PhD thesis [51]. Two main findings are highlighted here; the diversity of water sources used by rural populations in sub-Saharan Africa, and the different levels of performance achieved by children with various social forms of water. We recall that in our study, these social forms refer to different situations in which children had to objectify water in their contexts. The average objectivation scores obtained by the children from one switch to another will allow us to measure the differences in performance from one social form of water to another. Although based on small samples, our work has also highlighted local differences in children's water relationships between localities. However, we will focus here on the results above mentioned and relating to the diversity of water sources in sub-Saharan Africa and the objectivations of children in general according to the social forms of water. The variables from which we measure objectivations do not follow a normal distribution. We will, therefore, use non-parametric tests to make our comparisons of means. We will compare the means obtained in each situation using the Wilcoxon test for matched samples, using the statistical processing software S.P.S.S 21. We will also have to carry out multiple comparisons based on the results obtained on the same sample (N=68). Since we will perform three tests in two studies, from the same sample, we will have to be stricter in the interpretation of the results by adjusting the alpha threshold according to the Bonferroni procedure. As a result, the traditional alpha threshold of 0.05 will be reduced to 0.05/6. This will bring us back to a decision threshold below 0.008. For unilateral tests, we will have to divide this threshold by two. We will thus only estimate a significant result if it indicates a p -value < 0.004 .

7.1 Diversity of water sources

The relationship of adults to water sources in sub-Saharan Africa is very diverse due to the diversity of water resources themselves, but also due to how adults relate to them. *Table 2* presents the complexity of this relationship to water as implemented by the significant adults interviewed for each of the children in our sample. Some adults rely exclusively on a particular source (tap, well, pump, or river). Other adults, on the other hand, use several sources of water depending on many circumstances, including the price of the water, the distance or scarcity of the sources and the quality of the water. The latter make up the majority of the adults we interviewed. Another source of water was mentioned to us that is not included in this table, but that is also important to keep in mind; rain. Only one adult suggested this source of water in Togo, which we did not take into account the work of the children who were only able to make their passes during the third session.

Table 2: Summary of the various sources mentioned by adults and to which they refer for water.

Sources and reports to sources	Head count	Percentage	Valid percentage	Cumulative percentage
Tap	10	14,7	17,2	17,2
Well	6	8,8	10,3	27,6
Tap and Well	12	17,6	20,7	48,3
Pump and Well	4	5,9	6,9	55,2
Tap and River	10	14,7	17,2	72,4
Valid Tap, Well and River	10	14,7	17,2	89,7
Well and River	3	4,4	5,2	94,8
Pump	1	1,5	1,7	96,6
River	1	1,5	1,7	98,3
Pump and River	1	1,5	1,7	100,0
Total	58	85,3	100,0	
Missing Missing System	10	14,7		
Total	68	100,0		

7.2 Subjectivation of children in sub-Saharan Africa in their relationship to water

We are going to learn about the dynamics of subjectification of children from the objectivation scores they will achieve with our social forms ("natural", concerted and persistent). We will thus give an account of how children confront the various waters - blue and brown - of their contexts according to the social forms or situations in which this confrontation takes place. It is on the way, more or less socially organized around them of the reality of water that we make their subjectification depend. The less this relationship will reflect the isolation of the child and water, the less it will be detrimental to him, and the more it will be helpful for his personal development. In this study, in our approach to water, we have chosen to privilege its socially constructed aspect ("natural", concerted and persistent social forms), over its aspect of a gift as it presents itself in the environment for itself ("blue" or "brown" water). This does not mean that this last aspect is of no importance, but that it is necessarily a function of what in society can be endorsed. This is why it will be relevant first to see, in relation to the social forms of water, what is the objectivation of "blue" or "brown" water. In other words, which waters of first or second quality do the different levels of social implications

lead children to objectify or handle at best in a context where access to the latter is more common?

7.3 Scores of immediate objectivation (Im. O.) and mediation (O.de M.) of children according to the waters of "natural", concerted and persistent social forms.

We will now compare the (Im. O.) and (O.de M.) scores that rural children in sub-Saharan Africa will achieve according to the social forms of water they will be dealing with. These comparisons will be made using the Wilcoxon rank test for paired samples.

Table 3 presents the different means, medians and standard deviations of the objectivation scores (Im. O.) and (O.de M.) obtained by the children at each session. The 5% truncated mean here makes it possible to compensate for the effect of extreme values.

Table 3: Descriptive statistics of children's objectivation scores (N=68) by social forms of water

Statistics		"natural"	concerted	persistent
Truncated average at 5%	Im. O.	10,82	15,76	14,04
	O. de M.	9,27	12,68	9,41
Median	Im. O.	12	16	16
	O. de M.	12	14	12
S.D.	Im. O.	6,06	2,43	4,87
	O. de M.	6,56	5,39	6,80

7.3.1 In the "natural" social form

Table 3 shows a small difference between the mean Im. O. score (m= 10.82) and the mean O. de M. score (m= 9.27) obtained by children in the first "natural" session. This small difference is not reflected in the medians, which remain the same for both scores (Me= 12). The results obtained in Wilcoxon's ranking test on our sample data did not allow us to conclude that there is a significant difference between the Im. O. scores and the O. de M. scores among rural children in sub-Saharan Africa during the first session ($Z = - 1.994$; $p = 0.023$ on one side).

7.3.2 In the concerted social form

Table 3 shows a difference between the mean Im. O. score (m= 15,76) and the mean O. de M. score (m= 12,68) obtained by children in the concerted session. This difference is reflected in the medians, which differ for Im. O. scores (Me= 16) and for O. de M. scores (Me= 14). Wilcoxon's rank test shows that Im. O. scores are significantly higher ($Z = - 4.407$; $p = 0.001$ on one side) than O. de M. scores among rural children in sub-Saharan Africa in a concerted social form session.

7.3.3 In the persistent social form

Table 3 shows a difference between the mean Im. O. score (m= 14,04) and the mean O. de M. score (m= 9,41) obtained by children in the persistent session. This difference is also

reflected in the medians, which differ for Im. O. scores (Me= 16) and for O. de M. scores (Me= 12). The results obtained in the Wilcoxon rank test show, here again, that Im. O. scores are significantly higher than O. de M. scores among rural children in sub-Saharan Africa even with regard to water with a persistent social form ($Z = - 4.085$; $p = 0.001$ on one side).

7.4 The efficiency of social forms of water

Our results above, indicate that except the "natural" session, rural children in sub-Saharan Africa achieved better Im. O. scores than O. de M. they achieved this result in the concerted and the persistent sessions. But the result did not manifest itself to the same extent within these two sessions. Our results show that the children achieved significantly better objectivation of "blue" waters in the second and third session. But we found that this result would differ from one session to another. Notably, this result was not significant for the first session. The question now is to establish if there are sessions that allow us to better express this result on others, and this too, with significant differences from other sessions. It will be a question of determining in which situation the children obtained better objectivation scores.

7.4.1 Scores for the objectivation of persistent and "natural" social forms

Table 3 shows a difference between the mean Im. O. scores in the persistent session (m= 14.04) and in the "natural" session (m= 10.82). This difference is reflected in the medians for the two sessions (Me= 16) in the persistent session and (Me= 12) in the "natural" session. In addition, the table also shows a small difference between the mean O. de M. scores for the persistent session (m= 9.41) and the "natural" session (m= 9.27). The small difference is not perceptible at the level of the medians (Me= 12) in both sessions.

The Wilcoxon rank test shows that the Im. O. scores are significantly higher in the persistent session than in the "natural" session ($Z = - 2.939$; $p = 0.001$ on one side). On the other hand, we find no significant difference between the O. de M. scores obtained in the persistent session and in the "natural" session among rural children in sub-Saharan Africa ($Z = - 0.146$; $p = 0.442$ on one side).

7.4.2 Scores for the objectivation of concerted and persistent social forms

Table 3 shows a difference between the mean Im. O. scores in the persistent session (m= 14.04) and in the concerted session (m= 15, 76). But this difference is not reflected in the medians for the two sessions (Me= 16). The table also shows a difference between the mean O. de M. scores for the persistent session (m= 9.41) and the concerted session (m= 12, 68). The difference is perceptible at the level of the medians (Me= 12) in persistent session and (Me= 14) in concerted session.

Here, Wilcoxon's test shows that the Im. O. scores in concerted session are significantly higher than those of persistent session ($Z = - 2.869$; $p = 0.002$ on one side).

Similarly, we find that the **O. de M.** scores in the concerted session are significantly higher than those obtained in the persistent social form ($Z = -3.450$; $p = 0.001$ on one side). This allows us to conclude that both **Im. O.** and **O. de M.** scores are globally better in the concerted session than in the persistent session for rural children in sub-Saharan Africa.

7.4.3 Scores for the objectivation of "natural" and concerted social forms

Table 3 shows a difference between the mean **Im. O.** scores in "natural" session ($m = 10.82$) and in the concerted session ($m = 15.76$). This difference is reflected in the medians for the two sessions ($Me = 12$) in "natural" session and ($Me = 16$) in concerted session. The table also shows a difference between the mean **O. de M.** scores for the "natural" session ($m = 9.27$) and the concerted session ($m = 12.68$). The difference is perceptible at the level of the medians ($Me = 12$) in "natural" session and ($Me = 14$) in concerted session.

Finally, the Wilcoxon test shows that **Im. O.** scores are significantly higher in concerted session than in the "natural" session for children ($Z = -4.936$; $p = 0.001$ on one side). We also find that the **O. de M.** scores are significantly higher in the concerted session than in the "natural" session ($Z = -3.068$; $p = 0.001$ on one side). We can, therefore, conclude, here as before, that the objectivation scores in the concerted situation - **Im. O.** and **O. de M.** - are better than in the "natural" situation.

8. Discussion

The results show that rural children in sub-Saharan Africa have significantly higher **Im. O.** scores than **O. de M.** scores, whether they are concerned with objectifying water in a concerted situation (2nd session), or a persistent situation (3rd session). Interestingly, this result was not significant when children were dealing with water in the "natural" session. In other words, they generally obtain better objectivation scores with "blue water" than with "brown water", but not in the "natural" session. These results seem to us to indicate, not directly children's ability to use water in a way that benefits their development, but the extent to which their social environment was able to produce socially developed water at the place of their immediate grasp of water. The fact that this result was not significant in the first so-called "natural" session seems to indicate the difficulties they encountered in dealing with an isolated and complex object on their own. The question here is not only whether the child alone chooses water of the best quality when it is up to him or her to decide which water to use. It also arises before the choice is made, in terms of the child's capacity to access safe and convenient water for use in his or her social environment. It is this social possibility that makes the child's personal choice possible and not the other way around.

On our grounds and elsewhere, premium water is less about water reduced to its natural availability than about water that is socially available to the child in its most advantageous form for use. To put it differently, it is a water of such a form

that it contains the organization and social relief prior to the development of the child mentioned by Wallon [9]. The relatively low **O. de M.** scores of the children can be explained by the fact that "brown water", even if present and common in children's environment, is not the most advantageous to use in the sense of the construction of oneself. In other words and from a practical point of view, it is more difficult for children to grasp second quality water and to use it in a way that does not jeopardize their development. It remains no less than "blue water" water charged with social development. Still, it denotes, rather than a social organization around the object, a divestment whose many causes cannot fail to refer to the complex, intricate history and then the level of socio-economic development of the countries of sub-Saharan Africa [52], [53].

Furthermore, the results we have achieved by comparing the social forms of water, finally establish that the situation of water with a "natural" social form is not the most advantageous to the objectivations of children. In this situation, no comparative advantage is noted in the children's objectivation scores compared to persistent and even less to concerted situations. This leads us to conclude that the social form of "natural" water is inefficient in children's objectivation scores. It is neither efficient on the social form of persistent water nor efficient on the social form of concerted water. The efficiency of the persistent social form on the objectivation scores of rural children in sub-Saharan Africa is real but limited. It is only effective in comparison with the objectivation of first quality water in a "natural" situation. On the other hand, the social form of concerted water which corresponds to the conditions of the second session is the most favorable for water objectivation among rural children in sub-Saharan Africa. It thus corresponds to the social form under which the immediate, but also mediated seizure of water by children is most conducive to their subjective development and therefore to their subjectification.

The results of water efficiency of concerted social form indicate that social organization around objects, however limited, already leads to better development opportunities for children. This is already effective in such difficult terrain as rural sub-Saharan Africa, where access to necessities such as water can be difficult. However, the reality of a social object as we understand it would be drastically diminished if we made it dependent, in terms of social involvement, only on significant others. Our study can only present, on this broad question of social objects and child development, results that are as much reduced to the limited means it uses as to the level of social development of the populations under consideration. We have limited ourselves to grasp the reality of the social implications through significant others, which are only a very scant expression in the context of rural and sub-Saharan Africa.

This study has many limitations. More precise tools could have been used to allow for a more diversified data collection allowing their processing with parametric tests. This is conceivable, but it would mean taking into account the modes of expression of these rural populations, which are not very familiar with the use of the most common research

tools in the human sciences: multiple-choice questionnaires, structured interviews, etc. Rigorous management of research time can be difficult in rural areas with highly mobile populations and with many imperatives to manage daily. Thus, as mentioned above, the intervals between sessions could not be in line with the initial plan of one week between sessions. The children, therefore, did not have the same latency time from one session to the next. This may have altered, to an extent that is difficult to determine, our results. The data collection for this study was carried out by a single researcher in different rural areas and accompanied by an interpreter. A team of researchers, including local natives, would allow simultaneous data collection and might be better able to control the time of data collection. Finally, the Bonferroni correction applied to our tests indeed enabled us not to risk type I error by reducing the decision threshold. The downside of this procedure is that it increases the chances of wrongly concluding that there is no result (type II error). In this study, this shortcoming would again raise questions about the power of the tests used here.

Nevertheless, the results of the study clearly show that significant others are key players in the provision of water for children. But in rural contexts where water sources are not always the most appropriate [54], the relationship of adults to water sources for themselves determines the water that children will be able to access. We have been able to identify social development realities where adult activity to provide water for children is reaching its limit, not least because most of the water sources used by the adults in our sample are external sources. As for the diversity of water sources, the activity of significant others can only multiply it tenfold by the diversity of their own relationship to water, and adults with a difficult relationship to water tend to limit access to it for children, as expressed by adults in Mauritania and Senegal in particular.

9. Conclusion

This study aimed to explore the question of the relationship to objects which, as social objects, are likely to contribute to and support the process of subjectification. The practical relation to objects makes us take into consideration a perspective of objectivation [11] referring to a way of relating to objects that always prolongs, in a singular individual, social development. Man's relation to objects is not simple. It puts us in a position to invest another perspective of development where it would be a question of finding in the relation to objects and in the study of the development of this relation, the way to a new objective opportunity for the task of collective production of individual development. The exercise we have undertaken allows us, by situating water within social concerns, to bring to light the diversity of realities that an object summarizes if it is considered as social. Thus, it is the classical perception of an object in its simplified, abstract, isolated vision that this work allows us to review. If it is a question of elaborating new problems of subjectification by way of objectivation, the paths proposed here could make it possible to envisage in innumerable other objects, as social objects, not only the complexity of the social developments they

reflect, but also the relationship to individuals in which they can become supports for individual fulfilment.

References

- [1] Philippe Malrieu, "Les dires du je," in *La construction du sens dans les dires autobiographiques*, Erès, Ed. Ramonville Sainte-Agne, 2003, pp. 19–56.
- [2] N. Pizarroso, "Mind's historicity: Its hidden history.," *Hist. Psychol.*, vol. 16, no. 1, pp. 72–90, 2013.
- [3] T. Teo, "Critical psychology: A geography of intellectual engagement and resistance.," *Am. Psychol.*, vol. 70, no. 3, pp. 243–254, 2015.
- [4] A. MacIntyre, "How psychology makes itself true-or false.," in *A century of psychology as science*, S. Koch and D. E. Leary, Eds. New York: McGraw-Hill, 1985, pp. 897–903.
- [5] Kurt Danziger, *Naming the Mind: How Psychology Found its Language*, Sage. London, 1997.
- [6] R. Smith, "The history of psychological categories.," *Stud. Hist. Philos. Sci. Part C Stud. Hist. Philos. Biol. Biomed. Sci.*, vol. 36, no. 1, pp. 55–94, 2005.
- [7] E. Durkheim, "Débat sur l'éducation sexuelle.," in *Religion, morale, anomie. Textes II*, E. Durkheim, Ed. Paris (1975) pour la présente édition: Minuit, 1911, pp. 241–251.
- [8] E. Durkheim, *Éducation et sociologie*. Paris: Félix Alcan, 1922.
- [9] H. Wallon, "Le rôle de l'autre dans la conscience du moi.," *Enfance*, vol. 12, no. 3, pp. 277–286, 1959.
- [10] H. Wallon, "La crise de la personnalité (3 ans). Affirmation du Moi et objectivité.," in *Les origines du caractère chez l'enfant*, H. Wallon, Ed. Paris (2009) pour la présente édition: Puf., 1949, pp. 285–291.
- [11] I. Meyerson, *Les Fonctions psychologiques et les oeuvres*. Paris: Vrin, 1948.
- [12] A. B. Nsamenang and A. Dawes, "Developmental psychology as political psychology in Sub-Saharan Africa: The challenge of Africanisation.," *Appl. Psychol.*, vol. 47, no. 1, pp. 73–87, 1998.
- [13] C. Zaouche Gaudron, *Les conditions de vie défavorisées influent-elles sur le développement des jeunes enfants ?* Toulouse: Erès, 2005.
- [14] I. Meyerson, "Thèmes nouveaux de psychologie objective : l'histoire, la construction, la structure.," in *Écrits 1920-1983 : Pour une psychologie historique*, I. Meyerson, Ed. Paris (1987) pour la présente édition: Puf., 1954, pp. 92–104.
- [15] Philippe Malrieu, *La construction du sens dans les dires autobiographiques*. Ramonville Sainte-Agne: Erès, 2003.
- [16] I. Marková, *Dialogicité et représentations sociales*. Paris: Puf., 2007.
- [17] K. T. Ferguson, R. C. Cassells, J. W. MacAllister, and G. W. Evans, "The physical environment and child development: An international review.," *Int. J. Psychol.*, vol. 48, no. 4, pp. 437–468, 2013.
- [18] U. Bronfenbrenner and G. W. Evans, "Developmental Science in the 21st Century: Emerging Questions, Theoretical Models, Research Designs and Empirical Findings.," *Soc. Dev.*, vol. 9, no. 1, pp. 115–125, 2000.

- [19] G. W. Hegel, *Phénoménologie de l'esprit*. Paris, 2002 t.1, pour la présente édition: Gallimard.
- [20] K. Marx, "Le développement humain comme fin en soi.," in *Écrits philosophiques*, K. Marx and L. Sève, Eds. Paris, 2011 pour la présente édition: Flammarion, 1858, pp. 336–338.
- [21] P.-L. Assoun, "Figures de l'Autre," in *Lacan*, P.-L. Assoun, Ed. Paris (2015) pour la présente édition: Puf, 2003, pp. 63–69.
- [22] I. Meyerson, "Le signe et les systèmes de signes.," in *Écrits 1920-1983 : Pour une psychologie historique*, I. Meyerson, Ed. Paris: Puf, 1987, pp. 105–112.
- [23] K. Marx, "La philosophie ne campe pas hors du monde.," in *Écrits philosophiques*, K. Marx and L. Sève, Eds. Paris (2011) pour la présente édition: Flammarion, 1845, pp. 113–115.
- [24] K. Marx and F. Engels, "Feuerbach," in *L'Idéologie allemande*, K. Marx and F. Engels, Eds. Paris (2012) pour la présente édition: Éditions sociales, 1845, pp. 19–21.
- [25] K. Marx, *Le capital livre I*. Paris (2009) pour la présente édition: Puf., 1867.
- [26] L. Vygotski, "La méthode instrumentale en psychologie.," in *Vygotsky aujourd'hui*, J.-P. Bronckart and B. Schneuwly, Eds. Paris (1935) pour la présente édition: Delachaux et Niestlé, 1930, pp. 39–47.
- [27] L. Sève, "Présentation.," in *Pensée et langage*, L.-S. Vygotski, Ed. Paris: La Dispute, 2013, pp. 11–32.
- [28] I. Meyerson, *Existe-t-il une nature humaine ? Psychologie historique, objective, comparative*. Paris: Sanofi-Synthélabo, 2000.
- [29] C. Brassac, "Lev, Ignace, Jerome et les autres...," vol. XV, pp. 1–16, 2003.
- [30] K. Marx, "Lettre de Marx à Annenkov.," in *Misères de la philosophie*, K. Marx, Ed. Paris (2002) pour la présente édition: Payot, 1846, pp. 53–69.
- [31] L. Vygotski, "Les bases épistémologiques de la psychologie.," in *Vygotsky aujourd'hui*, J.-P. Bronckart and B. Schneuwly, Eds. Paris (1935) pour la présente édition: Delachaux et Niestlé, 1931, pp. 25–38.
- [32] L. Sève, "Temps historique et «condition humaine».," in *«L'homme» ?*, L. Sève, Ed. Paris: La Dispute, 2008, pp. 44–47.
- [33] F. Brentano, *Psychologie du point de vue empirique*. Paris (2008) pour la présente édition: Vrin, 1874.
- [34] S. Frosh, "Psychosocial Studies and Psychology: Is a Critical Approach Emerging?," *Hum. Relations*, vol. 56, no. 12, pp. 1545–1567, Dec. 2003.
- [35] L. Sève, "Postface à la troisième édition française.," in *Marxisme et théorie de la personnalité*, L. Sève, Ed. Paris (1981) pour la présente édition: Éditions sociales, 1974, pp. 525–596.
- [36] Philippe Malrieu, "La théorie de la personne d'Ignace Meyerson.," in *Pour une psychologie historique*, F. Parot, Ed. Paris: Puf, 1996, pp. 77–93.
- [37] S. P. Walker *et al.*, "Child development: risk factors for adverse outcomes in developing countries," *Lancet*, vol. 369, no. 9556, pp. 145–157, Jan. 2007.
- [38] J. M. Boden, D. M. Fergusson, and L. J. Horwood, "Alcohol misuse and relationship breakdown: Findings from a longitudinal birth cohort," *Drug Alcohol Depend.*, vol. 133, no. 1, pp. 115–120, Nov. 2013.
- [39] M. N. Asadullah and N. Chaudhury, "Poisoning the mind: Arsenic contamination of drinking water wells and children's educational achievement in rural Bangladesh," *Econ. Educ. Rev.*, vol. 30, no. 5, pp. 873–888, Oct. 2011.
- [40] D. Teferra and P. G. Altbach, "Trends and perspectives in african higher education.," in *African higher education: An international reference handbook*, D. Teferra and P. G. Altbach, Eds. Bloomington: Indiana University Press, 2003, pp. 3–14.
- [41] P. G. Altbach, *The Decline of the Guru : The academic profession in developing and middle-income countries*. New York: Palgrave Macmillan, 2003.
- [42] S. J. Spiegel, "Resource policies and small-scale gold mining in Zimbabwe.," *Resour. Policy*, vol. 34, no. 1–2, pp. 39–44, Mar. 2009.
- [43] S. J. Spiegel, "Occupational Health, Mercury Exposure, and Environmental Justice: Learning From Experiences in Tanzania.," *Am. J. Public Health*, vol. 99, no. S3, pp. S550–S558, Nov. 2009.
- [44] T. Monod, *Méharées*. Paris (1998) pour la présente édition: Actes Sud, 1937.
- [45] M. Dufumier, *Agricultures et paysanneries des Tiers Mondes*. Paris: Karthala, 2004.
- [46] J. Tibbetts, "Driven to Extremes Health Effects of Climate Change.," *Environ. Health Perspect.*, vol. 115, no. 4, p. 22, Apr. 2007.
- [47] D. Ben Yahmed and N. Houstin, *Atlas de l'Afrique*. Paris: Les éditions du Jaguar, 2011.
- [48] G. Labarthe, *Le Togo, de l'esclavage au libéralisme mafieux*. Marseille: Agone, 2005.
- [49] C. Zaouche Gaudron and C. Capel, "Les représentations maternelles du développement et les conduites de dépassement de soi chez le jeune enfant.," in *L'enfant dans le lien social*, M. de Leonardis, H. Féchant, Y. Prêteur, V. Rouyer, and C. Zaouche Gaudron, Eds. Toulouse: Eres, 2003, pp. 65–69.
- [50] S. Barbu, G. Cabanes, and G. le Maner-Idrissi, "Boys and girls on the playground: Sex differences in social development are not stable across early childhood.," *PLoS One*, vol. 6, no. 1, 2011.
- [51] S. R. Aïgba, "Subjectivation par voie d'objectivation de l'eau chez les enfants d'Afrique subsaharienne : terrains mauritaniens, sénégalais et togolais : développement subjectif des enfants de 4 à 7 ans envisagé sous le rapport à l'eau comme objet social.," LISST - Laboratoire Interdisciplinaire Solidarités, Sociétés, Territoires, Toulouse, pp. 1–248, 2015.
- [52] G. Courade, S. Guyot, M. Poussart-vanier, and P. Janin, *L'Afrique des idées reçues*. Paris: Belin, 2006.
- [53] M. Gassama, *L'Afrique répond à Sarkozy : contre le discours de Dakar*. Paris: Philippe Rey, 2009.
- [54] J.-N. Salomon, "La question de l'eau et ses enjeux.," in *L'Afrique continent pluriel*, F. Bart, Ed. Paris: Armand Colin, 2003, pp. 43–60.