

# Communication Technologies for Left-Behind Children in Rural China

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**Abstract**—Starting from a literature review focusing on the effects of distant parenting on left-behind children in rural China, it has been shown that increased remittances (i.e. sending of money) allowed an enhancement of physical health and academic performance. However, mental health was found to be seriously affected by the lack of parental care, thus increasing the likelihood of depressions during the children’s growth. A comparative analysis has been then realized, comparing three different scenarios of distant parenting: the first one covered the hospitalization of children, the second incarcerated parents and the third transnational parents, out-migrating for the same reason of the Chinese context. All three scenarios revealed the importance and the pros of communication technologies in distant parenting situations. To validate our assumptions, a survey has been forwarded towards parents and children having lived at distance during a continuous period of time, because of activities organized for the children (boy-scouting, summer camps and intercultural exchange programs). Both parents and children demonstrated to rate as essential the importance of communication between parents and children at distance. With even stronger and more sensitive settings than those joyful ones presented here, we anticipate how even more crucial the communication technologies might be rated by families of left-behind children. During an interview with an expert in Chinese anthropology and urban sociology, this hypothesis has been ascertained. Envisioning further investigations on the Chinese field, an interview protocol has been implemented and can be used to validate or refute our hypothesis, by questioning parents of left-behind children. Furthermore, the interview protocol provides a useful tool to analyze more in-depth the psychological effects of parents in this situation.

(Forbes 2018). Among those travellers, a substantial percentage consisted of migrant workers who moved from rural areas to more urbanized ones, in order to seek job opportunities. They live away from their family and usually all return home during the week before New Year, providing support to them via remittances throughout the year. According to Guo, Sun, and Wang 2017, “An increasing number of children in Chinese rural areas live far away from their parents, as about 80% of the migrant workers leave their children behind in their home-village”. For this reason, they are called “Left Behind Children” (留守儿童, pinyin: *liúshǒu’értóng*), because they are raised by other family members (the second parent figure or the grandparents) or, in the worst scenario, completely left on their own in their home village. The situation of departing parents has substantial impacts on the child’s development, depending on multiple factors involved.

Our research study aims at understanding how communication technologies, connecting parents with their left behind children in rural China, could be beneficial. First, when focusing the study on a subset of the population, as we are doing by specifying “Rural China”, a clear definition of this expression needs to be provided. According to Shen 1995, the definition is strongly influenced by three crucial censuses, which occurred in 1982, 1987 and 1990. Those collected statistics have been used to divide home-towns of each Chinese province into either “agricultural” or rural areas, and “non-agricultural” or urbanized areas. The 1990-census is the most widely adopted allocation between “agricultural” and “non-agricultural” villages for such kind of researches. Therefore, our study will be based on this definition of “rural China”. Nowadays, people are used to connecting with each other via always improving technologies (Bird 2018). We are thus interested in discovering patterns, in parallel to the enhancement of communication channels, between children and their distant parents. Our initial reasoning, biased by definition towards the western social context we have grown into, would indicate that the issue of left-behind children in China could harm both their physical and mental aspects. Moreover, our background suggests that a stronger communication between family members could lead to positive effects and eventually mitigate the issue. Such instinctive conclusions will be challenged during the course

## LIST OF ABBREVIATION

CHIC	China Hardware Innovation Camp
CRC	Convention on the Rights of the Child
ICT	Information and communications technology
LBC	Left-Behind Child(ren)
UN	United Nations

## I. INTRODUCTION

Every year, Mainland China witnesses the biggest human mass migration process on Earth, during the Lunar New Year celebrations (Jingyong Zhang et al. 2015). In February 2018, more than 385 million Chinese, according to Forbes (2018), converged back from cities to rural areas. This year, the purpose was to celebrate the year of the Dog, with their family

of the following research study. The Chinese context of left-behind children lays on the antipodes of our own and each conclusion we might consider trivial to draw needs to be reexamined in a different light. The study's goal is to explore if and how such context-issue located in China could benefit from enriched communication, via technological means.

To illustrate our work on the presented topic, we will undergo a series of key steps as follows: firstly, an overview in the form of literature review will showcase related work and previous investigations, regarding the left-behind children issue in China and the effects caused by it (section II); then, the methodologies followed during the research will be presented and covered (III); obtained results of the research are thus introduced to the reader with the help of descriptive statistics (IV); interesting patterns in the collected data will be retrieved and compared to the main issue regarding left-behind children, with the support of external expertise (V); and lastly, our final remarks and future scenarios on the presented work (VI).

## II. RELATED WORK

A large number of studies have been conducted about the reality of left-behind children, on different localities around the world. These studies have been focusing on different impacts of parental migration, from the children's perspective. Interestingly, this phenomenon is not only restricted to China (Song and Y. Zhang 2009; He et al. 2012; Guo, Sun, and Wang 2017; Fan et al. 2010; Bai et al. 2017), but also frequently appears in Mexico (Sawyer 2016; Kanaiaupuni 2000; Hildebrandt et al. 2005; Fernandez 1998; Dreby 2007), Latin America (Mundial 2006; Acosta, Fajnzylber, and Lopez 2007; Antón 2010), Romania (Botezat and Pfeiffer 2014), Philippines (Yang 2008; Cortes 2015; Arguillas and Williams 2010) and Thailand (Jampaklay 2006). In this section, specific terms used throughout the research will be defined. Then, related work will be reviewed, about the impact of parental migration on physical health, academic performance and mental health of left-behind children.

### A. Definitions and terminology

According to the United Nations (UN 1998), the commonly accepted definition of 'migrant' is "any person who changes his or her country of usual residence". A more precise classification can be introduced with time and space constraints (Rossi 2008). The process is then defined as "permanent", "long-term" (at least 12 months) or "seasonal", with either an internal or an international migration. Purposes of recreation, holiday, visits to friends, business, medical treatment, or religious pilgrimages are, although, not considered as migration processes (UN 1998). Two scenarios of parental migration can appear. Either the parents migrate with their children, or they leave them behind (Rossi 2008). Another possible result of parental migration is related to the issue of foster children. Although they share the same loss of parental care, the complete interruption of communication with both parents determines a completely different case that cannot be discussed nor compared with the two previously mentioned scenarios

(Pilon 2003). The commonly accepted definition of LBC (*left-behind children*) refers to children who stay at home when one or both parents relocate elsewhere, to join the labor force, for at least six months (Lu 2011). In the Chinese context, parental migration is considered to be seasonal and internal, since migrants move from rural to industrialized regions, spending yearly around 11 months away and returning home during the *Spring Festival*. The formal definition of 'children', given in the CRC (*Convention on the Rights of the Child*), Article 1 drafted by United Nations (1989), states that "individuals below the age of 18" form the children population. However, other conventions to define 'children' can be found. The 0-15 age range is the most adopted one, in accordance with the research context, due to medical (women fertility) and labor (legal working age) reasons.

### B. Impact on LBC's physical health

The study of Guo, Sun, and Wang (2017) reveals that the "overall effect" of parental migration on children's health is uncertain.

Several research studies found positive effects of parental migration on children's health (Mundial 2006; Acosta, Fajnzylber, and Lopez 2007; Antón 2010; Stillman, Gibson, and McKenzie 2012) and have mainly attributed them for the increased incomes of the family. Remittances helped reducing childbirth mortality (Hildebrandt et al. 2005), increasing birth weight and decreasing the number of underweight newborns (Frank and Hummer 2002). Children are better nourished and can take advantage of an eased access to health services (Nobles 2006). As a consequence, higher incomes enable the children to better manage chronic health problems through medication (Case, Lubotsky, and Paxson 2002).

Other research studies raised negative effects of parental migration (Amato and Gilbreth 1999; Kanaiaupuni 2000; Fernandez 1998), mainly due to the reduction of parental care. Song and Y. Zhang (2009) found that LBC started to overuse health services. A possible cause of this behaviour is the attempt to replace the lacking parental care by medical services. Another intriguing fact from this study is that the access to health services depended on whom the children were left with. Statistically, maternal migration had a negative effect on children's health. This result confirms several studies showing that maternal presence is essential for the development of a child (Cortes 2015; Jampaklay 2006; Macours and Vakis 2010; Thomas 1994). With paternal migration, longer time and distance of migration positively affected children's health, again as a consequence of increased remittances. Children's health status revealed to be also affected by socio-economic factors, dependant on the household (Behrman 1996). One reason why poor parents do not out-migrate could be the need of initial capital to cover emigration costs, for transportation and accommodation reasons. Lastly, health impact of parental migration has been shown to be independent to the child's age and gender (Guo, Sun, and Wang 2017).

### C. Impact on LBC's academic performance

The study of Bai et al. (2017) rejected the hypothesis that parental migration deteriorated the academic performance of children. Additionally, they found that when one parent or both out-migrated, the academic performance of LBC was even significantly improving, compared to the rest of the students. Increased incomes can, therefore, bring a larger impact than the reduction of parental care. Rising incomes might provide several benefits for LBC, like a better nutrition, improved access to educational materials and fewer housework responsibilities. An analysis about the heterogeneity of the impact, among children of different households, showed that the positive effect of parental migration was even larger for students initially poorly performing at school. An explanation for LBC's academic improvements is the availability of additional materials, which might have led them to overcome educational barriers that limited their performances. For instance, better-nourished students see their academic performance rising (Luo et al. 2012). Remittances could also be invested in tutoring and other additional learning materials like books, computers and learning software. The positive impact of parental migration has been found to become larger when the out-migrating parent had a poor level of education. If the parent has a high level of education, a trade-off between parental tutoring and migrant remittances appears. Therefore, depending on the out-migrating parent's background, the impact on the academic performance can significantly differ among LBC (Sawyer 2016).

### D. Impact on LBC's mental health

According to the study of He et al. (2012), LBC were at greater risk to develop depression, compared to the other students. The work confirmed a previous study from Fan et al. (2010), conducted on the same topic. The emotional disturbances and higher risks of depression are more evident in specific age-ranges. During early adolescence, changes in sexual cognition and social development occur, leading to determinant consequences for the overall maturity process. Without parental care, psychological problems occurring in the late childhood and adolescence can introduce direct repercussions on LBC's mental health, increasing the indicators of adult depression risks (Kosterman et al. 2010).

The results presented in the Chinese context were further confirmed by another study, deriving pieces of evidence from Romania (Botezat and Pfeiffer 2014), where the migration fluxes end towards more occidental European regions. Compared to non-migrant households, the study illustrates substantial increases in depression, as well as higher propensity to be bullied during childhood, particularly in rural areas. These research insights match previous results from the literature on the mental health of left-behind children (Gibson, McKenzie, and Stillman 2011; Dreby 2007; Mazzucato and Schans 2011). Children left alone to take care of themselves, living in an environment without any adult supervision, result in even larger risks of depression (Lahaie et al. 2009).

Ren and Treiman (2016) realized a more philosophical research about the possibility of wrongly perceiving causes of depression with Chinese LBC. The research compared the difference of family "arrangements", or emotional bonds between parents and children, in China and other countries where the phenomenon of parental migration frequently occurs (i.e. Nicaragua, Philippines, Mexico). They concluded that, in the Chinese context, these family arrangements have "little impact on the emotional well-being of children". For this reason, researches about LBC in the specific context of China should be considered a singularity of its own, due to the impressive number of internal migrants, incomparable to any other country. From the Chinese point of view, since the situation of leaving children behind became more common in rural areas (Hao 2006), non-Chinese researchers shall be cautious about their belief of understanding the local social context in China.

## III. METHODS

In this study, we seek to evaluate how communication technologies could alleviate the negative consequences of parental migration in rural China. As widely covered in the previous section, LBC are particularly subjective to retain long-term effects on mental well-being, due to the absence of parental care in crucial ages. Therefore, we aim to investigate how the increasing adoption of ICTs (*Information and communications technologies*) might improve the condition of Chinese families in this context.

To this end, a research methodology has been structured as follows. The topic of ICTs for families will first be analyzed from a more global perspective, focusing on different geographical areas and situations. Our findings will be subsequently related to the local reality faced in rural China. In this manner, the importance of fostering communication technologies between distant parents and children will be explored, through a comparison of related studies within western countries (subsection III-A). Then, after drawing subsequent assumptions, these latter will be tested through a study case realized in our geographical proximity (Switzerland, France and Germany). For this purpose, the recruitment of the samples will be highlighted (III-B), before diving into the content of the survey (III-C).

### A. Comparative analysis on similar situations

In this subsection, an analysis of different scenarios will be presented, investigating whether communication affects the mental well-being of children. The first sensible context that will be approached relates to hospitalized children, with long-term chronic diseases disrupting their previous social routine. The second scenario will explore the challenges faced by imprisoned parents to communicate with their children. The last scheme portrays transnational families, for which at least one of the parents left the family to migrate to another country.

a) *Hospitals*: In the research, conducted by Wadley et al. (2014), is shown that children undergoing long term hospitalization face psychological obstacles, due to a brutal change of previous daily habits. A long term isolation from their social life, both from their family and peers at school, causes concerns to their emotional well-being. Furthermore, this social dislocation occurs at a time when social engagement is crucial for children's development, as explains the study of Hopkins, Moss, et al. (2014). A comparable situation emerges between this context and the LBC issue, despite the different duration of separation. Furthermore, staying "out of sight" (Yates et al. 2010, page 80) can lead to apprehension for the isolated child, about coming back to meet again after a long period of time. Therefore, ICTs' capabilities need to be further investigated. Innovative ICTs could not only be used to bridge distant people together, but also enhance emotional well-being by avoiding staying too long out of each other's mind.

According to different studies (Vernon et al. 1971, Bossert 1994 and Thomson 2012), hospitalization can increase children's stress. Parents, on the other hand, must continue working and may also experience anxiety and sense of guilt, not being able to be present for their child. This context, thus, shows similarities with migrating parents, leaving their children behind. As revealed in the studies of Stewart-Brown (1998) and Ryan and Deci (2001), physical diseases could also result from emotional distress. Social support through ICTs, therefore, becomes essential for distant families. The research from Hopkins, Nisselle, et al. (2013) highlighted the impact of prolonged absence from school, possibly resulting in a child's disengagement that can later cause employment difficulties. Challenges associated to unpredictability and vulnerability of children's health within the hospital's context, presented by Yates et al. (2010), can be compared to fears and worries of migrating parents, regarding their LBC.

Indirectly contributing to the emotional well-being of persons in sensitive settings, this first analysis of ICTs within hospitals already clearly demonstrates how technology could provide support and connection between LBC and out-migrating parents.

b) *Prison parenting*: In 2007, 1.7 millions of children had an incarcerated parent in the United States of America (Glaze and Maruschak 2008). Poehlmann et al. (2010) state that these children experience a larger risk of substance abuse, behavioural problems and thus academic failure. Furthermore, poverty and changes in caregiver due to the parents' incarceration are either the cause or a "risk marker" (Murray and Farrington 2008) of children's problematics.

Children's age is an important factor to take into consideration when approaching the parent-child interactions in this context. Infants, for instance, particularly need contact with their mother. In fact, Byrne, Goshin, and Joestl (2010) showed that infants who stayed in the nursery program of the prison, where the mother resided, were more likely to keep a long term attachment with their mother (with respect to other children discharged from the program less than one year after their

arrival). The actual parent-child mean of contact may differ with the age of the child since infants are not able to write letters or even have an oral conversation. Furthermore, when children are too young to have their own opinion, caregivers might act as "gatekeepers" (Enos 2001). Thus, instead of facilitating the parental contact with the child, some might even limit it. Then, when becoming teenagers, children further develop their verbal skills and sometimes start visiting their incarcerated parents, hiding it from the caregivers (Shlafer and Poehlmann 2010). An absence of contact with the parents might cause feelings of alienation to the child (Shlafer and Poehlmann 2010) since no one ever gave enough affection and attention to let the child feel self-confident.

Parents, on the other hand, might feel stress from losing contact with their children (Day et al. 2005, Clarke et al. 2005, Magaletta and Herbst 2001, Roy and Dyson 2005, J. Arditti and Few 2008). Experienced symptoms of incarcerated parents are depression and anxiety (Houck and Loper 2002). The impressive outcome is that both direct and distal communications are able to improve the state of mind of incarcerated parents. Poehlmann (2005) showed that visits could decrease the depression of mothers in prison. Likewise, Loper et al. (2009) discovered that mothers with more frequent phone calls, letters or emails were feeling less distress. As Casey-Acevedo, Bakken, and Karle (2004) associated joy and relief to visits, distant communications can also have a significant impact on parental mental health.

Regarding facility visitation policies, depending on the institutional security level, the parents are allowed to receive "full" contact visits (where physical contact is allowed), or "open" but without contact visits, or "barrier" visits (occurring with a Plexiglas barrier) (Johnston 1995, Sturges and Hardesty 2005). In some jails, visits can even happen only through a television transmission, where the incarcerated parent and the child are located in two separate areas. From this literature review, child visits can happen to be associated with emotional distress, together with uncomfortable environments and almost no opportunity for meaningful contact, as also explained by J. A. Arditti (2003) and Loper et al. (2009).

Parents might prefer avoiding their child seeing them in a rather negative environment. Incarcerated parents thus prefer contacting their family with alternatives to visitations, such as written correspondence, because the settings are more under the parental control than on the authorities of the penitentiary. On the other hand, the child is less likely to overhear inappropriate discussions. The parent might be more relaxed and focused on the content of the interaction with the child, rather than on the environment. Visitation rooms, letters and phone calls become the child's reality of the relationship with their parent. When children and parents did not manage to keep in contact, visits could also be stressful for the child. A perfect transition before initiating visitations could then be remote forms of contact. Alternatives for younger children, not yet apt to communicate orally, could make the use of a playful interaction. To conclude with regard to this context, distal communications offer flexibility (Tuerk and

Loper 2006), which is not given to incarcerated parents.

c) *Transnational parenting*: The study of Bacigalupe and Lambe (2011) provides another relevant example to test the importance, for growing children, of having communication channels with their family. The paper focuses on the increasing adoption of ICTs in migrant families and how technologies can ease the parenting role that became more difficult with the distance.

The first key consideration the study highlights is the need to completely change people's state of mind about ICTs in family communications. The general public is often reminded of the negative impact an over-usage of technologies could bring in the family bonds. In fact, the adoption of technologies in a household might lead to unhealthy and, paradoxically, even distant connections with the other family members. However, when families face the situation of living at distance, the previous negative statements about ICTs need to be questioned. Therefore, a transnational family context cannot be modeled as the common family idea, where both parents and children can easily meet in reality.

An objective analysis of the study's content could not be possible without taking some distance with the paper. Face-to-face relationships are not anymore the only manner to maintain and build a social bond between people (Bacigalupe and Lambe 2011). Introducing new possibilities of ICTs, this vision can be completely remodelled. Licoppe (2004) describes this new era of communication technologies as "a continuous pattern of mediated interactions that combine into 'connected relationships', in which the boundaries between absence and presence eventually get blurred" (page 135-136).

The research of Bacigalupe and Lambe (2011) recalls that parental migration always existed since civilization exists. However, it often implied a sharp consequence on the household stability. The social concept of family often identifies the parental caregiving when growing children. Without ICTs, out-migrating parents would require frequent visits or, since recently, expensive international calls in order to keep a solid family bond. Most migrants, due to scarce resources, were not able to maintain such a functional long-distance family. This lack of parenting would eventually cause the irreversible problems during the child growth identified in the literature review (section II). Therefore, ICTs could bridge migrated parents with the rest of the family and provide the missing communication channel that leads to an unhealthy child's growth. We believe that, potentially, such new communication technologies could be the key to mitigate negative mental consequences, introduced in the context of LBC in China.

The role of ICTs is to allow families to engage in a "transnational care-giving". The rising adoptions of smart-phones, primary kind of ICT, is a clear signal of the importance such technologies have in the process. In fact, transnational families benefit from those tools to accomplish each small parental duty, necessary to the well functioning of the family such as bedtime routines or even hygiene check-ups. To further analyze this process, one needs to first define parental care-giving

in detail. According to Finch (1989), it could be expressed in five basic forms: 'financial' (i.e. remittances), 'practical' (i.e. sharing expertise), 'personal' (i.e. hands-on care of sickness), 'accommodation' (i.e. having a place to stay), and 'emotional' or moral support (Bacigalupe and Lambe 2011). The adoption of communication technologies gives access for children to a new channel that effectively provides care-giving, as described, by migrant parents. Therefore, by using ICTs, transnational families are able to cover each of the forms of care-giving listed previously (Baldassar 2007). While some of these forms could be argued to need real proximity with the parents and in-person visits, all of them can still be handled at distance. Furthermore, with ICTs, the emotional and moral support from parental care-giving would be strongly enhanced and could, therefore, be mitigating the negative consequences of mental well-being for LBC.

In conclusion, the usage of ICTs in migrant families is less likely to have the negative impact that families living close together could face. ICTs actually provide a tool to strengthen family connections otherwise very difficult, if not impossible, to maintain. In this new light, we think that children of out-migrating parents could benefit from communication technologies to mitigate consequences identified in LBC mental health. By enriching accesses to different forms of parental care-giving at distance, as defined Finch (1989), ICTs may be the key to improve the difficult conditions of migrant families.

#### B. Recruitment

In the analysis covered in the previous subsection, the importance of communication channels between growing children and the rest of the household has been clearly highlighted. Moreover, similar negative effects to the ones identified in the LBC's context were presented. Therefore, considered as not completely grown up yet, children below the legal age (18 years old in Europe, 15 years old in China) require strong communication with their parents to avoid negative mental consequences, regardless of the surrounding context. Even though each person's background is different, communication appeared to represent a key component of a healthy child's development.

In order to enrich our research, we decided to test this assumption in our own local context. The purpose of this section is to introduce the procedure that has been used, before presenting the results (see section IV).

The objective of this phase is to understand the importance of communication in distant households and how ICTs might have helped mitigate negative effects related to that context. To this end, we decided to tackle the problem by identifying different situations present in our reality (a "Western context", primarily focused in Switzerland, France and Germany) in which households would be separated for a continuous amount of time. A complete recruited-population research has been done, which provided promising results for situations such as summer camps, scouting adventures or intercultural exchanges. Kids and teenagers whom joined such programs have spent from a couple of weeks (specifically the younger

ones) up to six months or a year away from their family. As we previously did in the definition of LBC, by identifying constraints on both child age and family-separation time, the same must be done with the recruited population. While tackling the question from our local perspective, a trade-off aroused on the population characteristics. As mentioned, the younger the children and the less likely the children have spent more than a couple of weeks away from their family. On the other hand, increasing the age of the participants induced longer separation-times, better matching those of LBC (of at least six months). Therefore, during the discussion of the results, these factors shall be kept in mind to draw a more accurate conclusion.

In addition to children and teenagers recruitment, particular consideration from the parents' side has been taken. Since the study focused on the importance of communication, obtaining results concerning the two sides of the channel could potentially lead to richer conclusions. Moreover, especially when dealing with younger children, parents could provide more easily the needed information.

While reading the previous paragraphs about the sample population recruitment phase, the reader might underline the impressive difference between the LBC issue and the distant-parenting experiences chosen. In fact, results collected from this selected population are difficult to relate to the Chinese issue because of the former experiences a family-detachment due to joyful and/or educative motifs. On the other hand, the migration decision is forced by much more difficult reasons. However, other possible populations have been considered to be recruited for such phase. Military recruits, who are often required to spend significant periods of time away from their home, or incarcerated parents who face the challenge of communicating with their family as already presented before could have led to richer results in the research. Although, due to difficulties with such recruitment, a trade-off has been achieved, thus leaving more accurate populations for further investigations and future iterations of the study.

To collect the data from those two described populations, an online survey has been prepared and posted on social media platforms. Initially, to be able to draw statistical conclusions, the expected minimum number of answers was set to 30 situations of distant parenting with children below 18 years old. Not being able to reach enough valuable data, we decided to turn ourselves to associations. The objective was not only to obtain more insights towards distant-parenting situations, but also to reach a more homogeneous population. Thus, we have been in contact with a consistent number of associations to spread out the survey (refer to annex D for the list of contacts). The idea was to examine the question in our own region, by reaching out entities in the Canton de Vaud (eventually expanding then to Switzerland as a whole), whose work related to distant parenting experiences for children and their families.

### C. Content of the survey

As previously mentioned, the goal addressed with the survey was to determine the importance of maintaining a communication channel via ICTs, in any context of distant parenting. We aim to directly test on our European local reality how kids, away from their family, might find comfort in this connection. Even though the population we recruited and described in the previous section is mainly composed of families divided by joyful activities (intercultural exchanges, summer camps, etc.), homesickness can easily emerge. For this reason, even this type of joyful experiences can lead to a substantial decline in the emotional well-being, particularly for young children at their very first time away from home. The content of the survey intends to give an understanding about how essential channels of communication become for distant families in such context and, therefore, even more crucial in harder situations as the ones experienced by LBC in China.

The survey was written down in both French and English to maximize its accessibility. Post-processing tasks have then merged the results for comparisons. Moreover, the survey contained similar questions for both parents and children, but each from their own perspective to eventually later draw conclusions, with respect to both groups of family members.

To investigate the problem, the survey tried to collect enough demographic data of both children and parents, answering about their first experience of distant parenting. The idea is to, during the afterwards analysis, determine different patterns in how the communication channel might be correlated to gender, age or parental role (mother and father). This latter, for example, might be interesting because it could lead to results similar to the ones mentioned in our literature review for LBC in China. Different parental roles are key factors in how the distant parenting experience is handled. Furthermore, we investigated the kind of short-term "migration" to better understand how families have dealt with it, particularly in cases of long duration distant parenting and young ages of the children.

Before diving into the analysis of the results, the reader may first want to explore the questions that have been asked in the survey (appendix A). First, the context of the survey has been briefly explained. Then, questions were split into two categories, depending whether the person answering the survey has lived the situation of distant parenting as a child or a parent. Both child's and parent's gender were asked, in order to understand whether a stronger relationship could appear between distant mothers and children, as described in previously mentioned related work (section II-B). Then, more precise questions about the context of distant parenting situations were asked (reasons, duration, age of the child). The focus of the survey was on the communication technologies used during that period of time (frequency, main purpose and mean of communication). Finally, the questioned people were asked how they would rate the importance of communicating with their distant relatives. Notice that the scale has been chosen from 1 to 7, with value 1 corresponding to insignificant

and 7 to essential, in order to keep one neutral answer (4/7) and three possible choices of negative (3/7 and below) and positive answers (5/7 and above). Notice as well that when the importance of communication is presented as null (0/7), it means that no data has been received for a particular setting of distant parenting (i.e. in fig. 11 with the frequency of communication corresponding to "once per month").

#### IV. RESULTS

This section reports the results of our study, organized around the questionnaires. In total, 116 persons have answered the questions that have been presented previously. Before diving into the analysis (see section V-A), the collected statistics need to be objectively presented. First of all, the sampled population present the following characteristics: 55.9% of the questionnaires have been filled with the English form, against 40.1% in French; 75% of the population was composed of children (37.9% sons and 62.1% daughters), and 25% by parents (10.3% fathers and 89.7% mothers). The two main features of interest are the *Child's age*, to compare the input with the LBC issue, and the *Importance of communication* from which we aim to draw relevant conclusions. Such characteristics are presented in tables I and II, for the children and parents population, respectively. The first class contains 87 children, with a mean age of 14 years and 3 months old (14.31), having spent at least three days away from their family. These children rated, on average, the importance of communication 5.80 over a maximum score of 7, with a standard deviation of 1.46. The second class (29 questioned parents having lived a distant parenting experience with a child of 9 years old on average) rated the importance of communication at 5.79, with a standard deviation of 1.69. Despite the difference in the total number of parents and children having participated to the survey, both final results regarding such latter feature are surprisingly close to each other.

TABLE I  
STATISTICS FOR THE CHILD RESULTS OF THE SURVEY

	Child's age	Importance Rating [0-7]
Mean	14,31	5,80
Std	5,06	1,46
Min	2	2
25%	10	5
50%	14	6
75%	18	7
Max	23	7
Count	87	

TABLE II  
STATISTICS FOR THE PARENT RESULTS OF THE SURVEY

	Child's age	Importance Rating [0-7]
Mean	9,00	5,79
Std	3,23	1,69
Min	3	0
25%	7	5
50%	9	6
75%	10	7
Max	17	7
Count	29	

To conclude the section, we present to the user the statistics illustrated in the previous tables by adopting box-plot representation for each feature. Figure 1 illustrates the different input data regarding children's age. Even though the parent population is considerably smaller than the children one, it generally focuses on a younger age range that better matches the premises of the research. Despite the heterogeneity of the two sampled categories, figure 2 illustrates surprising close results regarding the importance of communication.

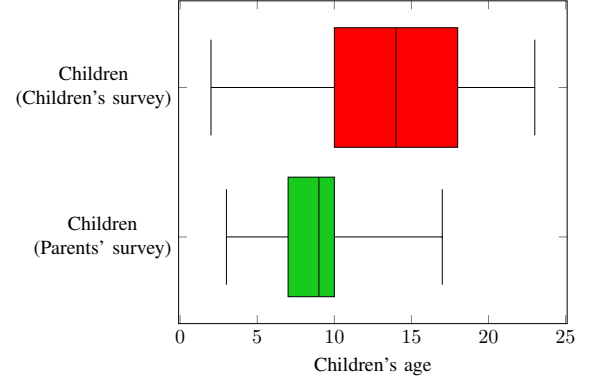


Fig. 1. Age of the children by the two categories of samples. Notice that the 'Parents' samples have filled their children's age, illustrated above.

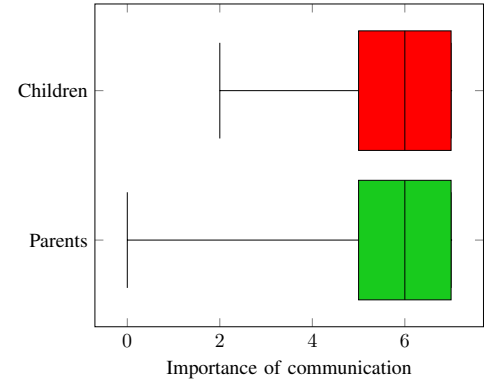


Fig. 2. Importance of communication rated by the two categories of samples

#### V. DISCUSSION

The methodology of this study converged in a collection of results obtained through a research on the importance of maintaining a communication channel between parents and children, during distant-parenting situations. In the previous section, the results have been introduced in order to better define the sampled population. The aim of this section, on the other hand, is to construct from these objective results, our own hypotheses on the issue, by identifying the interesting patterns according to different features of the data (subsection V-A). Then, we will discuss whether the obtained hypotheses could be transposed back to a Chinese context, seen for the LBC issue (V-B). Lastly, we will draw an interview protocol, aimed to be helpful for a future field test in Mainland China,

that could eventually bring to us the final prove, or disprove, to our hypotheses (V-C).

#### A. Analysis of the results

In this first part of the discussion, we aim to get a deeper understanding of the obtained results, that have been described in the previous section. The goal is to determine whether interesting patterns could be retrieved from the studied population, in accordance with the distant-parenting issue, and how this latter is faced by distant families.

As already mentioned while explaining the content of the survey (see section III-C), the literature review proposed substantial differences in the way the paternal or maternal figures dealt with distant parenting. Unfortunately, the data on the parent side is not sufficiently rich to draw a representative analysis and to determine whether similarities in our survey occurred. On the other hand, we might be interested in discovering unknown outlines on the child's side according to statistics (like age, gender, etc.) that have not been sufficiently explored yet.

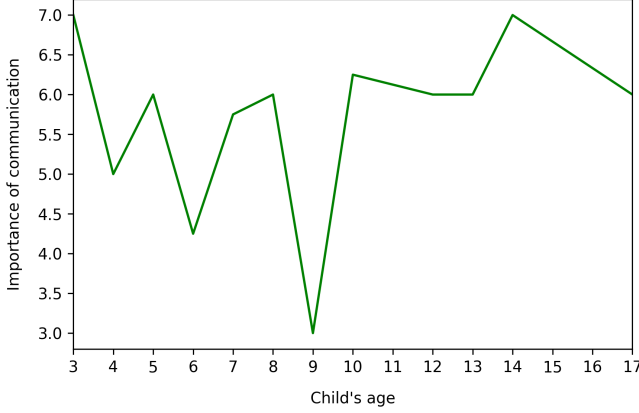


Fig. 3. Averaged importance of communication rated by the parents category, over child's age

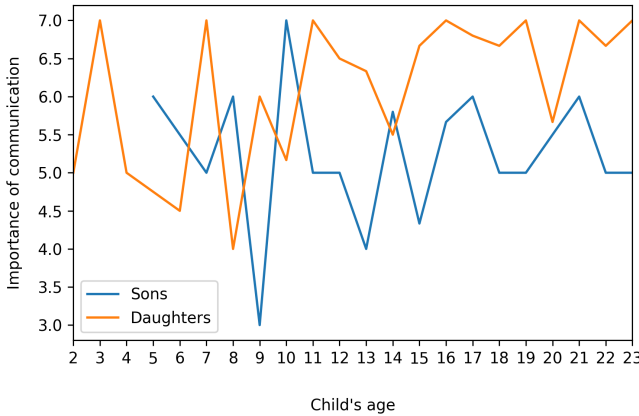


Fig. 4. Averaged importance of communication rated by the children category, over child's age

The very first outcome from the collected data is about the feature regarding the importance of communication. We wanted to understand how the importance of communication was perceived, by both parents and children, and specifically how other factors might modify its trend. The two plots in figure 3 and figure 4 illustrate how the adoption of communication technologies (ICTs) are perceived by parents and children, according to different child's age during the distant-parenting experience. As already shown in the initial results (table I and table II), the importance is generally perceived as extremely high, regardless of age differences. Although this latter might seem a trivial consideration, it is useful to keep in mind that such results are strongly related to the context from which they have been extrapolated and might be different in other social conditions and in other cultures, such as China. In order to avoid biases of any kind due to triviality in our own perspective, every result needs to be considered at this stage to later discuss it, in the Chinese context (see section V-B). Moreover, the two plots already illustrate the second consideration we can draw from the results. The trend clearly showcases a strong inclination of daughters, compared to same aged male peers, to give a higher weight to the importance of communication, from the age of ten years old (figure 4). Such results, therefore, suggests a possible exploratory pattern toward different responses according to child's gender and age, when being away from home for the very first time.

The plot presented in figure 5 tries to relate the frequency of communication with distant parents-children, according to different duration of the journey, during which the children spent time away from their families. The first intuition we had regarding a possible child's *gender bias* in the data is confirmed by such plot. It generally illustrates a higher tendency for girls to have more frequent communication with their distant families, regardless of the duration of the experience. Would this trend suggest that daughters are more likely to consider communication more important than boys?

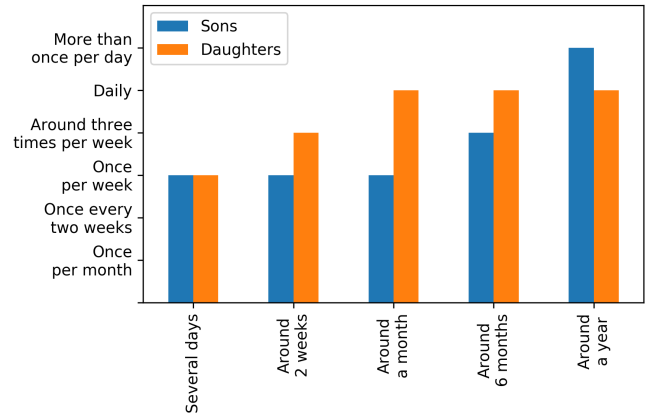


Fig. 5. Distribution of communication frequencies, over the duration of distant parenting



Due to the amount of data collected, the exploratory analysis could be conducted on a higher granularity of distinct representative sets. This would allow to better understand what information the data contains and avoid falling in the possible trap of drawing conclusions from outliers. Firstly, we decided to project the data according to the duration of the distant-parenting experience, from both parents' and children's perspectives. We aim to determine whether the *gender bias* trend could still be appreciated. Plots in figure 6 and figure 7 illustrate those findings from the children's and parents' point of view, respectively. We can indistinguishably see the same *gender bias* trend, where girls perceive an higher importance of communication when staying away from their family (see figure 6). However, it is interesting to compare those results from the parents' perspective, where this trend is not prominent (see figure 7). The importance of communication for parents is generally not affected by the child's gender (nor the duration of the experience neither). Although the data-set collected from the parent side is far from being a reliable sample, results tend to be more homogeneous between children's gender (the only exception being a short-termed duration of several days), when compared to the child's perspective illustrated before. As already discussed previously, in the context from which such data has been collected, drawing a conclusion where parents consider equally important a communication channel with their children regardless of their gender might seem trivial. However, every result will be at last evaluated against the Chinese context, for which considerable amount of literature exists regarding gender discrepancies, mainly based on the *One-Child Policy* of the past decades. Lastly, for the reader's interest, a plot illustrating the same data (from the parents' perspective), without any partitioning on features, can be found in the appendix C.

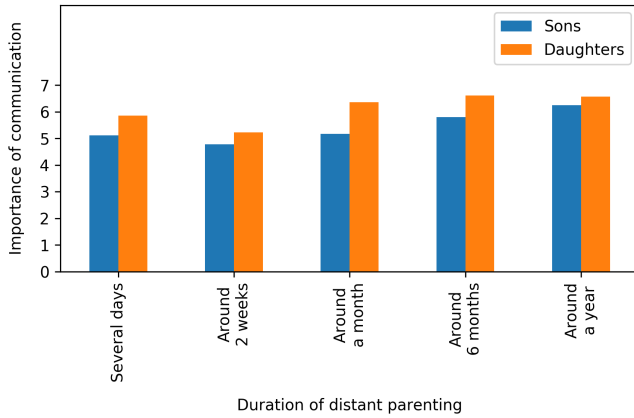


Fig. 6. Averaged importance of communication rated by the children category, over the duration of distant parenting

The same analysis from both the parents' and children's perspectives has been conducted on the *Frequency of communication* factor base. This latter exploratory step, in conjunction with the previously computed plots, would help to better define discovered patterns on multiple variables, in order to detect

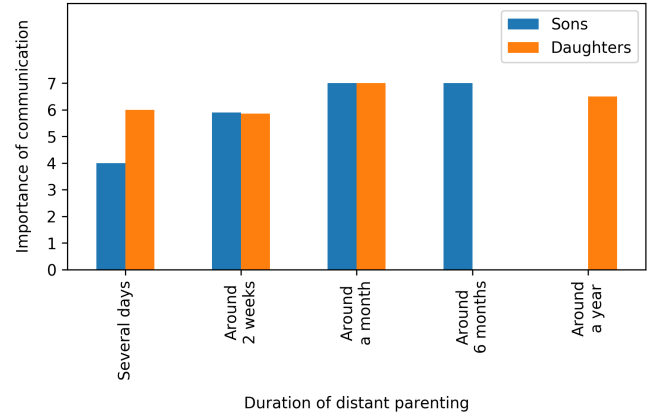


Fig. 7. Averaged importance of communication rated by the parents category, over the duration of distant parenting

variances in the data. The two plots illustrated in figure 8 and figure 9 showcase such distributions from the children's and parents' points of view, respectively. As previously proposed, an analysis on the parent data without partitioning, which does not present peculiarities to discuss, can be found in the appendix C. Once again, there is a clear tendency for girls to express a much higher importance towards communication, regardless to how frequent distant families communicate throughout the experience. In short, the bias child's gender showcases, with respect to the communication, is once again confirmed. On the other hand, parents tend to not showcase any different behaviour according to their child's gender, reinforcing the hypothesis that a *gender bias* would not exist on their point of view. However, it is interesting to underline how both plots (which are modelled around different sample groups, one for children and one for parents) identify a peculiar prominence for boys (or parents with a son) to higher rate the importance of communication, whenever the frequency of communication hits the "every other week" point. In order to draw solid conclusions about such peculiarity, an higher sampled population would be required to not mistake outliers for defined patterns.

In conclusion of this in-depth analysis around the collected data, some interesting trends have been identified. We have first reminded how important every result always needs to be considered in the correct context, due to differences in social and cultural factors between our population and others. The analytic conclusion is based on the population sampled in the referenced "western countries" (Switzerland, France and Germany) and will require more hypotheses to extend it to other social contexts (China). In fact, as we mentioned in the literature review, it is important to always be cautious and not forget how different cultures determine different family "arrangements". Thus, that might give an unexpected result to trivial questionings. First of all, our test population proved how communication with distant family members, through ICTs, is generally ranked extremely high. This result has

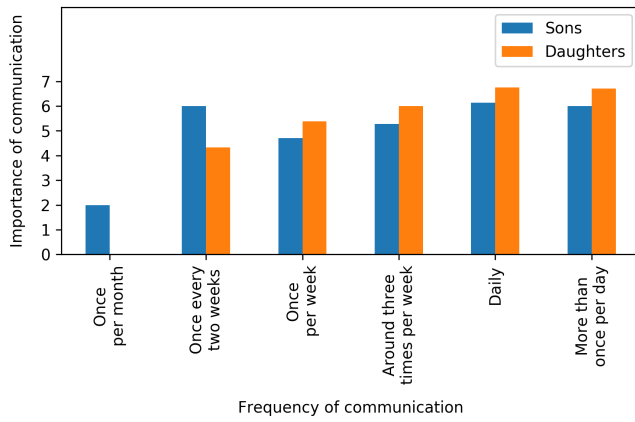


Fig. 8. Averaged importance of communication rated by the children category, over the frequency of communication

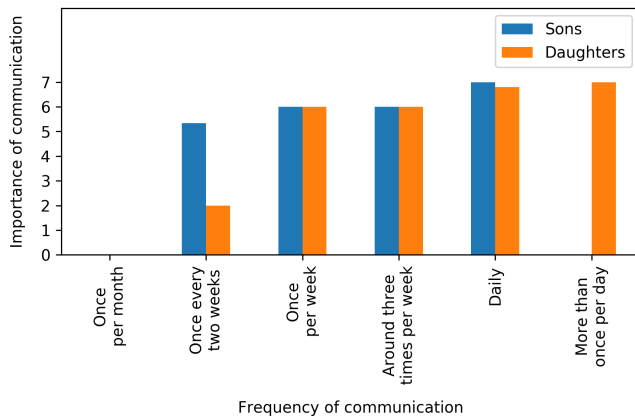


Fig. 9. Averaged importance of communication rated by the parents category, over the frequency of communication

been verified by both parents' and children's perspective on the issue. A second result, not considered previously, has been drawn from the data analyzed in this section, regarding the *gender bias* of children facing the situation of distant parenting. With the help of numerous and different plots, it has been possible to identify such trend throughout the data. Lastly, it has been possible to test that such *gender bias* is not prominent from the parents' point of view. In this case, we either need to collect more data to see undiscovered patterns, or the importance of communication is not correlated differently according to the child's gender. Such hypothetical patterns illustrated previously will be discussed within the Chinese context in the coming section, in order to reconnect our research findings to the LBC issue we began with.

### B. Transposability

In this subsection, we aim to compare the results analyzed in the previous part to the Chinese context. The chosen methodology for the research, illustrated previously (see section III), has currently provided substantial results from both past studies

on the topic as well as field conclusions from the conducted survey. From a global perspective (both geographically and contextually speaking), the importance of communication for children's growth has been identified to be crucial. Moreover, during the previous subsection, the survey's results underlined some peculiar patterns in the data between different characteristics of the sampled population. However, such conclusions (both from previous studies and our own ones) cannot be generalized to any other context, without a careful analysis on the transposability between different social environments.

Such described analysis has been conducted with the help of Ms. Graezer Bideau, expert in Chinese anthropology and urban sociology, with whom we met in order to discuss the findings of our study. The interview with an anthropologist has widened our own vision of the research topic. The patterns identified during the analysis have been presented and then examined, to extrapolate conclusive hypotheses for the transposability question.

Our first finding drawn from the data collected is a general high weight given to the importance of communication factor when experiencing distant-parenting situations. Section IV already indicated a significant average of 5.8/7, from both children and parents perspectives. Thanks to the insights of Ms. Graezer Bideau, we have been able to assess how working sacrifices in those conditions correlate, in general, to their monetary expenses. Earned money of migrant workers is in big percentage collected and sent to the home-village in the form of remittances. On the other hand, the remaining portion of the money is commonly consecrated to both the home-journey during the Spring Festival, as mentioned in the introduction, and the purchase of smartphones and SIM cards. The latter clearly showcases the importance of communication for family households of migrant workers. Via the acquisition of such commodities, parents that are not able to stay with their children during eleven months per year can, however, hold a substantial bond with them. Proof of such importance can be spotted in a commercial boom of mobile phones sold in the early 2000s in China, when a decade before, it was common to have a single public phone shared by the whole community of a quarter. The technological advent of mobile phones has, therefore, left a much stronger mark compared to other places in the world, where landline phones appeared in between. Due to this social context, where means of communication have become essential to maintain family bonds while being at distance, phone purchases can directly showcase how important the connection holds families together.

The second pattern discussed in the analysis (see previous subsection V-A) is related to what was previously named *gender bias* between sons and daughters, experiencing similar situations. We have discovered that there exists a general tendency for daughters to rate the importance of communication higher, compared to sons. However, such pattern was not identified from the parents perspective where they did not distinguish behaviours according to their children's gender. In the transposability phase, according to our knowledge on the Chinese reality, we wondered whether the social context

or even the known *One-Child policy* could involve different results. Specifically, could the fact that such policy results in a slight unbalance between genders (with a preference for sons)? Would migrant parents, therefore, showcase a slightly higher weight towards a gender, if they were asked to rate the importance of communication as well? The interview with Ms. Graezer Bideau gave us again the chance to obtain interesting insight and draw, afterwards, even unexpected conclusions. In fact, customs in Rural China indicate that whenever a daughter is married, she is expected to move to the groom's home to help taking care of the family. This, over the years, led to a common preference for sons as they would be staying home after the marriage and continue providing support to the household. According to Li, Yi, and Junsen Zhang 2011, during the 1980-1990 decade, the *One-Child Policy* led to an average of 4.4 extra boys per 100 girls, accounting thus for 57% of the total gender ratio imbalance. However, while clearly determining a significant asymmetry between gender ratios, the *One Child Policy* led to both an extensive and impressive gender equality in the social context. Due to the reality, where the majority of families would raise one single child, differences between sons and daughters went gently fading away. Most Chinese parents, and specifically the ones migrating in order to find job opportunities, dedicate their major attention towards improving their child's future. It is the main reason why such phenomena of LBC started in the first place. Firstly, parents could provide their families financial support via remittances. Secondly, parents migrate to fight the Hukou (i.e. household registration) system (户口, pinyin: *hùkǒu bù*), which could potentially limit the possibilities for their child to access urban areas, where the services quality is better. Parents could eventually allow an urban household registration, that could also benefit their child. In general, Chinese households tend to consist of a single child that inevitably represents for the family the totality of their future lineage. The distinction between sons and daughters in such new reality has been, therefore, substantially weakened. Thanks to this reasoning, we can understandably predict similar patterns in both Chinese and Western contexts, regarding how parents would consider the importance of communication with their distant children. As we have identified for parents in the sample population, regardless of their children gender, such importance is weighted constantly. However, such assumptions cannot be directly tested, at this phase, and will still need to be considered as hypothesis for the continuation of the research study.

In conclusion, our analysis on the transposability question, between collected results within western countries towards the Chinese reality, has been widely covered. The expertise of the anthropologist helped us enriching the discussion around the question and pushed us to investigate untouched areas in detail. This interview allowed us to consider, under appropriate assumptions, a re-conjunction towards the Chinese context as feasible. We have been able to identify some similarities between hypotheses drawn from the tested population and the Chinese social reality we are interested in. However, families

within the Western context, already having access to different communication technologies, might feel different about the importance of communication than disconnected families living in Chinese rural areas. Therefore, further investigations need to be done with a real contact in China, in order to validate the drawn deductions. Thus, the following section introduces an interview protocol, as a mean to question parents of LBC in Chinese urban areas.

### C. Interview protocol

As an output of this research process, we wanted to create a tool that could be useful to proceed this research. For this purpose, an interview protocol has been realized and validated by Ms. Preissmann, expert in cognitive and experimental psychology. The reason for realizing an interview protocol is that the presented research, about the importance of communication technologies between distant parents and children, has been realized in Switzerland and not in China. Based on our study, later work could be to analyze the real importance of communication, questioning parents living the Chinese reality of leaving their children in their home village, out-migrating in the cities to join the labor force. In this section, the content of the interview protocol and the methodology followed during its preparation will be explored. The full content can be found in appendix, section B.

First, the interviewer is asked to fill some basic information about the interview settings. In case of misunderstandings or missing details during the analysis of the results, this type of information could let the interviewer remember some missing comments, forgotten to be added to the interview protocol. The following sections are entitled, indicating its purpose and an approximated duration to allocate in order to fit within the 40 minutes of session length. Then, the aim of the section is also written to ensure that the interviewer clearly understands what is expected from every part of the interview.

The first section, named "*1) Introduction & Setup (5 mins)*", presents a to-do list to assist the interviewer setting up the appointment with a systematic approach.

Then, section "*2) Demographics & Background (5 mins)*" showcases generic questions to render the interviewee as comfortable as possible, while collecting a basic demographic insight.

Section "*3) Main questions (20 mins)*" lists the questions of interest, within the scope of the research on LBC. Thus, the first questions ask generic information about their children, to slowly get into the main questions about the interviewed parent. Notice that the most important questions to be asked to the interviewee have been marked with an asterisk. Most of the 40 minutes session length should be allocated for this part, as it is the one of major interest. These questions are more a guideline to the interviewer than a to-do list of questions. In this part, the social dimension of the interview needs to be caught. The aim is to understand how parents, living far away from their children, live this situation, not only emotionally but also practically. For this reasons, the questions related to

the logistical aspects of distant communication have all been marked with an asterisk.

Section "4) Interviewee's *"show and tell"* prototype (8 mins)" is only relevant for the authors of this research, participating in the CHIC (China Hardware Innovation Camp) program (in which teams of six students are asked to envision and develop a connected device, before actually finalizing the prototyping phase in China). In this case, a plush toy aiming at helping distant parents interact with their young children (between two and six years old), not yet capable of properly expressing themselves, either orally or in writing.

The last section, named "5) *Closing* (2 mins)", gives some advises on how to properly end the interview, thanking and offering the interviewee a last opportunity to ask questions.

## VI. CONCLUSION

Initially, the aim of this research was to understand how communication technologies could enhance the condition of left-behind children in rural China.

For this purpose, a first step was to investigate the related work about left-behind children, not only in China but all around the globe, to compare the eventual differences among families of different cultures living the same situation of distant parenting. The following conclusions are applicable to any family at distance, independently from the family origins. The "overall effect" (Guo, Sun, and Wang 2017) of parental migration on children's physical health is unclear because several positive and negative effects might add themselves. The main cause of children's physical health improvements comes from the increase of family incomes, due to the parental remittances. In fact, birth weight has been shown to increase because children are better nourished, thus decreasing child-birth mortality. On the other hand, the main cause of negative impact on the children's physical health is related to the lack of parental care. Concerning the academic performance of left-behind children, their capabilities have been shown to be significantly improved, again thanks to the rising family incomes. Additional educational materials and better nutrition provided significant benefits to help the children better perform at school. However, from the mental point of view, left-behind children seem to present larger probabilities of developing depression, related to the lack of parental care. However, this result might not be applicable in the Chinese context, due to the different family settings between parents and children, more physically distant compared to Western families.

Then, our research, properly speaking, started by seeking comparable situations of left-behind children in our geographical proximity. Three scenarios have been depicted and related work on each of those have been reviewed. The first one related to children at distance from their parents because of hospitalization. The main difference with this scenario and Chinese left-behind children is that the rupture in the routine of the hospitalized children might be of stronger negative impact, relative to the emotional bonds between European parents and children, and to the habit of living distant from each other. In this setting, communication technologies revealed to be helpful

in supporting the children from such an intense change in their daily habits. The second scenario was focusing on the situation of prison parenting. In this case, the main difference with the Chinese context is that incarcerated parents are forbidden to be present for the children. In the Chinese context, parents chose to live this situation to enhance their children situation. The situation of distant parenting creates thus an aspect of emotional distress on the parental side, which is much stronger than in the Chinese context. Chinese parents might be even more respected by their children for everything they do in order to enhance their possibilities. The major positive aspect of communication technologies for incarcerated parents was to bring flexibility and control over the communication, which appeared to be very difficult in this type of situation. The third and last explored scenario was about transnational parenting in general. This situation appeared to be the most similar one to the condition of Chinese parents, also out-migrating, within the country (opposed to the transnational example), to seek for better job opportunities. The example of transnational parenting seems to give a very promising future to communication technologies in the Chinese context. In fact, parents at distance from their children use these available communication channels to engage and keep their caregiver duties towards their children, ensuring they have everything needed.

In all three scenarios, communication technologies demonstrated to provide support to distant parents and children. Since we could not test these deductions on the Chinese reality, we wanted to make sure that these assumptions were applicable in our own locality. For this reason, we first sought to contact prisoners, then families with military parents, unfortunately in vain, before ending up with children having spent time away from their parents for more joyful experiences, such as summer camps, scouting adventures and intercultural exchange programs. Nevertheless, the reasoning was that if the importance of communication technologies is key in such positive and enjoyable settings, communication technologies could be considered even more essential in a more difficult configuration such as the one of interest in the Chinese context. Different associations have been contacted and have accepted to forward our survey to the children (and their parents when possible) having participated in their programs. The main goal of this survey was to understand how useful and appreciated were the communication technologies, from both children's and parents' points of view. An objective representation of the results, shown with statistical box-plots, clearly demonstrated how important communication technologies are for distant parents and children, in such fortunate settings. A more in-depth analysis revealed that daughters judged more important communication technologies than did male children.

To understand whether these deductions could be applicable in the Chinese reality of left-behind children, as we could not interview Chinese children, students or parents having lived the situation of left-behind children, we managed to get an interview with Ms. Graezer Bideau, expert in Chinese anthropology and urban sociology. This expertise has let us

validate how essential is the communication between distant parents with their left-behind children, for who they do all these sacrifices.

As an output of our research, an interview protocol has been realized. This tool can be helpful for any later research on the field, around the question of communication technologies for left-behind children and parents at distance.

To conclude, an interesting question could be to reflect on how communication technologies would, in the end, impact the Chinese habits. Considering this more physically distant relationship that parents have with their children, how would these communication technologies perturb the family arrangements present nowadays?

#### ACKNOWLEDGMENT

We would like to thank the contacted associations (listed in the appendix D) that helped us forwarding the survey about the importance of communication. We are also grateful to the 116 persons who spent a few minutes answering the survey. Finally, last but by no means least, a very special gratitude goes out to Mr. Laperrouza, Ms. Graezer Bideau, Ms. Preissmann and our peer-reviewers who assisted us during this research. It has been a fantastic opportunity to work with experts and have insights from different fields on the question of LBC in rural China.

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## APPENDIX

In the following appendix, the reader is presented with additional content of the developed research study. In section A, the actual content of the prepared survey is illustrated. Section B contains the full interview protocol that has been realized. Additional plots, that did not need particular discussion during the analysis of the results, are presented in section C. Lastly, the list of contacts that helped us sharing the survey is included in section D).

### A. Questions of the survey

In this section is shown how the participants were questioned towards the survey. Only the questions in English will be shown here, skipping the French translations.

#### *Form about communication technologies :*

Realizing a research project about social sciences within EPFL University (Lausanne), we would like to understand the importance of communication between parents and children, when they are at a distance during a continuous period of time.

1. In what language would like to answer this form?

2. To contextualize, we seek either :

- parents of a child having spent a period of time away from the household,
- children, teenagers and young adults having spent a period of time away from their family.

After having read the description above, do you qualify yourself as a parent or a child?

- If "parent" was selected question 2:

3.a. Are you the mother or the father?

4.a. Have you already been separated from your child for at least 3 days? (Exchange semester abroad, holidays, summer camp, scout, etc.)

5.a. If there were more than one experience of distance parenting, please consider the earliest one of them through the rest of the form (when you were the youngest). What is the reason why your child was distant from you?

6.a. For how long have you been distant from your child?

7.a. How old was your child at that time?

8.a. What is your child's gender?

9.a. How often did you use a communication technology with your distant child? (Text messages, phone calls, video chat, etc.)

10.a. What kind of information did you seek from communicating with your distant child?

11.a. How would you define the importance of being able to communicate with your distant child?

- If "child" was selected question 2:

3.b. Have you already been separated from your family for at least 3 days? (Exchange semester abroad, holidays, summer camp, scout, etc.)

3.b. If there were more than one experience of separation from your family, please consider the earliest one of them through the rest of the form (when you were the youngest). What is the reason why you were distant from your family?

4.b. For how long have you been away?

5.b. How old were you at that time?

6.b. What is your gender?

7.b. How often did you use a communication technology with your family? (Text messages, phone calls, video chat, etc.)

8.b. What kind of information did you seek from communicating with your family?

9.b. How would you define the importance of being able to communicate with your family?

### B. Interview protocol

The following interview protocol has been prepared for the research on "Communication Technologies for Left-Behind Children in Rural China", in the scope of the "Global perspectives, local realities" SHS course. To continue our research on the Chinese field, by interviewing parents of left behind children, our assumptions could be tested and eventually further analyzed.

Please, fill in the missing information as follows before starting the interview session:

Author: Matteo Yann Feo & Simone Sanso

Session length: 40 minutes

Participant Name: \_\_\_\_\_ ← Fill in

Email: \_\_\_\_\_ ← Fill in

Time/Date: \_\_\_\_\_ ← Fill in

Location: \_\_\_\_\_ ← Fill in

1) *Introduction & Setup (5 mins)*: The session starts with a short introduction to what this interview is about, the context and the background for which it is being conducted. In the meantime, be sure that everything is setup correctly by double checking the following To-Do list:

- ☐ Setup the recording tools and check if they work correctly.
- ☐ Prepare note-taking utilities, such as pen and paper.
- ☐ Verify the environment, being sure to have a relaxed location for the following 40 mins.
- ☐ In case a beverage is desired in the meantime, be sure to have it ready and available now.
- ☐ Be sure that your interviewed person has everything needed.

The introduction of the interview could be similar to the following one:

"Good morning and thank you for participating! I am Yann. I am studying at EPFL for a master degree in computer science. My main interest for this interview is to understand whether a technology of communication embedded in a smart toy could be helpful for parents distant from their children. During the interview, I will be having a conversation with you, asking questions that could help me to achieve my curiosity. In the meantime, my partner, will be assisting me by taking some notes. It is important to always remember that we are not evaluating you or your opinions in any way, there are no possible right and wrong answers that you could give. Here is how the session is going to proceed. Firstly, we'll break the



ice by asking you a few general questions to know each other. We will record this interview, given your consent. We won't ever share this recording nor use it for anything else but pure support for this interview, so that I can go back and review things later to make sure we got everything right. Your name won't ever be linked to any result, so be relaxed and feel free to share your thoughts with us, without any troubles. Keep in mind that this is completely voluntary, the recording can be stopped whenever you want. Thus, if you don't like this idea, please let me know. How does all that sound to you? Do you have any questions at this point?"

- ☐ Ask the interviewee to sign the written consent for recording purposes.

2) *Demographics & Background (5 mins)*: This section will help us creating a background of the interviewee, while allowing him/her to start opening up to our questions. Use this session as a warming-up occasion to break the ice, while catching the first important features. Start to note down details on the interviewee, like gender, age, education level, marital status.

- ☐ Tell us your name, and a little bit about yourself.
- ☐ Where do you come from?
- ☐ What is your occupation? Are you studying or working? In both cases, can you tell us something about it?
- ☐ Where are you currently living? Do you live with someone, or alone?

3) *Main questions (20 mins)*: The following questions can be helpful to interpolate your impressions with the interviewee's feelings and personal stories. Use them carefully as they might be intimidating for some people. Don't forget to check for nonverbal behaviors, as they might be critical to have a complete idea of who you are interviewing, especially in this part. Note that the most important questions to be answered are marked with an asterisk (\*).

(\*) Pre-interview questions about their children :

- ☐ How many children do you have?
- ☐ How old are they?
- ☐ What gender are they?
- ☐ Where do you they live?
- ☐ With who are they staying in your home village? (Lonely, with one of both parents, with grandparents or other relatives)

Main interview questions about the interviewed parent :

- ☐ (\*) How often and for how long do you come back home?
- ☐ What is the main reason why you live far away from your children?
- ☐ How do you feel about this situation, not living with your children?
- ☐ Remember the last time you went back to your home village, how was the contact with your children? Was the meeting with your children as before you left them?
- ☐ During your childhood, have you ever experienced living far away from one of your parents? If yes, for how long? How did you live the situation? Could you tell

us what was the main reason of your parent to out-migrate? How was the contact when meeting again with your parent? Could you communicate together, at that time, while being distant? (Check for non-verbal reactions while interviewee showcase personal experience)

- ☐ How common is your situation of distant parenting? Do you know any other persons in the same situation as you? How do they live it?
- ☐ (\*) How would you define the importance of living with your children? In your case, is there a trade off between living with your children and having a job position? If yes, imagine that you could live in an ideal world, what would be the best solution? Would you rather work in your home village or be able to bring your children in town?
- ☐ (\*) Do you own electronic devices? If yes, which ones? (Smartphone, computer, more...)
- ☐ (\*) Do your children in your home village own electronic devices? If not, would they have the opportunity to use any? (Neighbourhood, school, etc.)
- ☐ (\*) Do you use electronic devices to contact your children? If yes, how often? In general, are you calling your children when you have time? Or do they also get in touch with you, on their initiative?
- ☐ (\*) From 0 to 7, how would you define the importance of communicating with your children? (0: insignificant, 4: neutral, 7: essential) (Check for non-verbal reactions while interviewee showcase personal experience)

4) *Interviewee's "show and tell" prototype (8 mins)*: This section is practical and allows us to showcase our project, related to the issue of distant parenting. In the context of CHIC (China Hardware Innovation Camp), a plush toy that encourages social interaction between parents and children, in a distant situation. It is a very resourceful moment, as it could bring additional and authentic feedback on a novel user scenario.

The explanation of the prototype could be similar to the following one:

"We have been working on this prototype. It is a plush toy that encourages social interaction, by having remotely turned on LEDs and sounds from a mobile application. Parents and children can therefore stay longer connected. Letting your children know when you think about them will help you stay 'together'™."

Showcase the prototype and how it works with the mobile application.

- ☐ What do you think about the idea?
- ☐ In your opinion, which are the positive and negative aspects?
- ☐ If you had the possibility to try this technology, would you be interested?
- ☐ What would you modify to improve it?

5) *Closing (2 mins)*: Thank the user at the end for participating to the session. Offer the possibility to ask any kind of

question the interviewee might want to address you. This is his/her time to wear the interviewer's shoes in your regards.

If the interviewee has no additional question, the interview is officially finished. Thank again your interviewee for the time and availability to participate to this session. Underline how useful his/her help has been for the project. Turn off the recording tools only when you are completely sure that nothing will be added. It is important to not miss anything, so better have some extra recording to cut later.

Take some time to, directly after the end of the interview, write down some impressions you may have about the session. It is important to note down very early impressions about both verbal and physical languages, before they are forgotten. Those are the most authentic resources to get.

### C. Additional plots of the results

The following plots have been computed for the analysis of the data, collected via the survey on distant parenting. This appendix contains a set of plots that did not need particular attention during the discussion, but can still be an additional source of investigation.

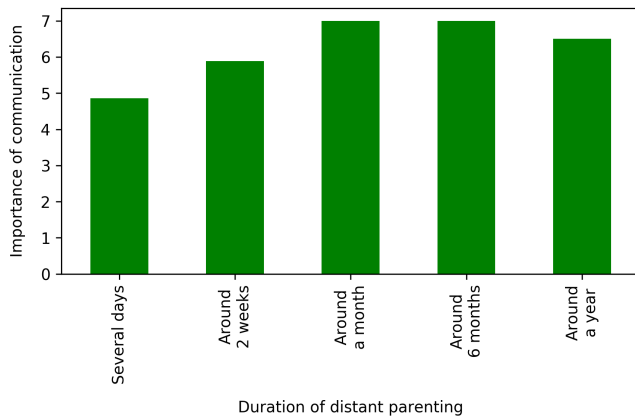


Fig. 10. Averaged importance of communication rated by the parents category, over the duration of distant parenting

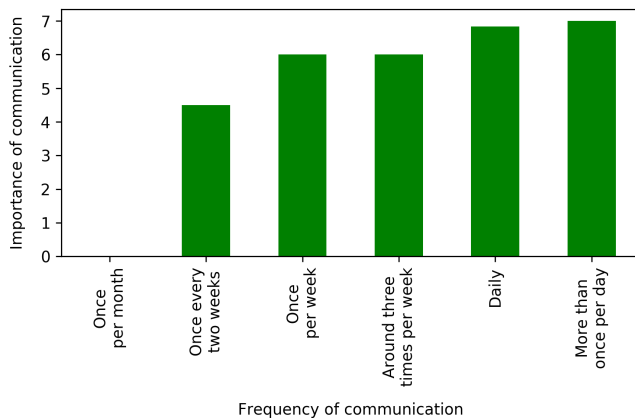


Fig. 11. Averaged importance of communication rated by the parents category, over the frequency of communication

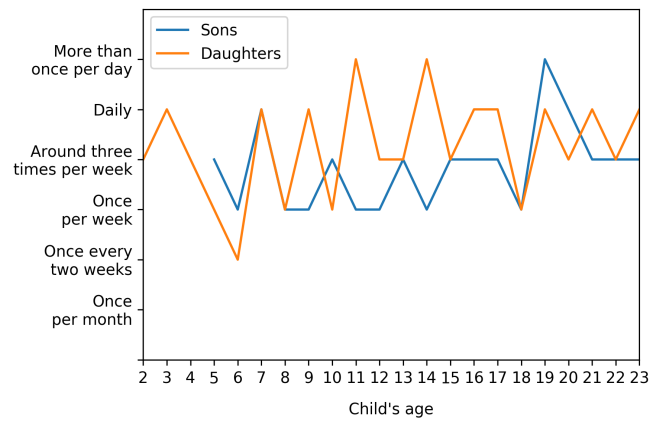


Fig. 12. Averaged communication frequency over child's age

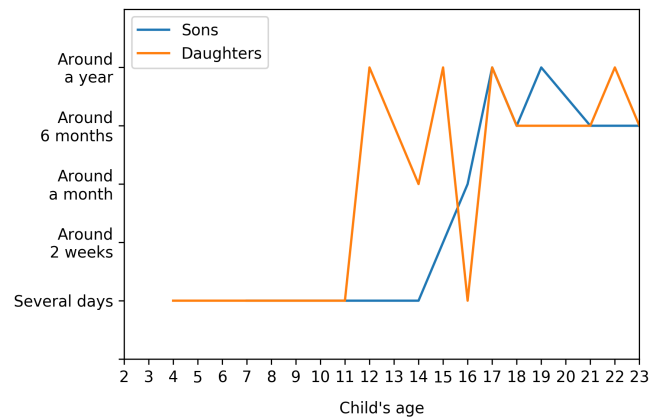


Fig. 13. Averaged duration of distant parenting over child's age

### D. List of contacts

Below are listed all the contacts that have been reached, to spread as much as possible the survey.

- AFS programs for adolescents (15-18 years old):  
Duration: 1 year  
Kernstrasse 57, CH-8004 Zurich  
Tel: +41 21 323 19 19  
Email: hello@afs.ch  
<https://www.afs.ch/fr/programmes-scolaires/>
- Canada-France exchange (16 years old):  
Duration : 3 weeks  
College of Jeanne d'Arc, 15 Rue du Chanoine Brun,  
68100 Mulhouse, France  
Tel: +33 3 89 45 36 31  
[www.ejda.fr/](http://www.ejda.fr/)
- International exchange programs (14-18 years old):  
Duration: 1 year  
Rue Centrale 15, 1003 Lausanne  
Tel: +41 800 822 811  
<https://www.efswiss.ch/fr/highschool/>

- National observatory of the Erasmus + impact (1 year or 6 months):  
Email: [observatoire@agence-erasmus.fr](mailto:observatoire@agence-erasmus.fr)  
<http://www.agence-erasmus.fr/page/observatoire/>
- Journal of international mobility:  
Email: [revue@agence-erasmus.fr](mailto:revue@agence-erasmus.fr)  
<https://www.agence-erasmus.fr/page/JIM>
- Exchange program Brigitte Sauzay (14-17 years old):  
Duration: 3 months in a host family in Germany and welcome 3 months in the family in France  
<https://www.ofaj.org/contact.html>
- Internal exchanges and language stays in Switzerland (14-17 years old):  
Duration: 1 year  
College of Delémont, Avenue Station 7, 2800 Delémont  
Tel: +41 32 421 00 70  
Email: [info@coldel.org](mailto:info@coldel.org)  
<http://www.college-delemont.ch/fr/Aide-aux-eleves/Echanges-et-sejours-linguistiques/Echanges-et-sejours-linguistiques.html>  
Cantonal manager of linguistic exchanges:  
Patrice KAMBER, Pâquerettes 2, 2822 Courroux  
- Prof: 032 435 65 92 / Private: 032 422 83 62
- Language Exchange and Mobility - DIP Geneva:  
Catherine Fernandez Sonino: Head of Exchange & Mobility DIP of the Cantonal Office for Language Exchange and Mobility  
Chemin de l'Echo 5a, 1213 Onex  
Email: [catherine.fernandez@etat.ge.ch](mailto:catherine.fernandez@etat.ge.ch)  
Tel: +41 22 327 06 43, +41 79 175 56 46  
<https://edu.ge.ch/site/elem/>
- Service of primary and secondary schools of Lausanne:  
Place Chauderon 9, 5th floor, PO Box 5032, 1002 Lausanne  
Tel: +41 21 315 64 11 - Fax: +41 21 315 60 04  
Email: [seps@lausanne.ch](mailto:seps@lausanne.ch)  
<http://www.lausanne.ch/etablissements-scolaires/>
- Summer camp of Neuchâtel:  
Gisèle Nicaty  
Quartier du Milieu 86, 2127 Les Bayards  
Tel: +41 79 288 50 41, +41 32 866 17 29  
Email: [giroud.p-a@bluewin.ch](mailto:giroud.p-a@bluewin.ch)  
<http://www.echanges-scolaires.com/index.php/fr/>
- Summer camp of the Grandes-Roches:  
1348 le Brassus  
Tel: +41 21 845 66 90  
Email: [camps@asime.ch](mailto:camps@asime.ch)  
<http://www.grandesroches.ch/home>
- Association of the Gros-de-Vaud Holiday Camp:  
Mrs Florence Ethenoz  
Chemin du Petit Record 60, 1040 Echallens  
Tel: +41 21 881 10 76  
Email: [info@colo-gros-de-vaud.ch](mailto:info@colo-gros-de-vaud.ch)  
<http://www.colo-gros-de-vaud.ch/clubdesk/www>
- Summer camp 4Fun:  
Email: [airfred@hotmail.com](mailto:airfred@hotmail.com)  
<http://4-fun.ch/>
- Summer camp CPV:  
Swiss Village Street 14, PO Box 72, 1211 Geneva 8  
Tel: +41 22 809 49 79  
Email: [info@camps.ch](mailto:info@camps.ch)  
<http://www.camps.ch/fr/accueil>
- Scouts of the Sacred Heart:  
Jeanne Voruz & Anne Thiébaud  
Tel: +41 79 844 92 74 & +41 79 284 50 38  
Email: [cg@sacrescout.ch](mailto:cg@sacrescout.ch)  
<http://www.sacrescout.ch/>
- Village Camps:  
PO Box 1425, Rue de la Morache 14, 1260 Nyon 1  
Tel: +41 22 990 9400  
Email: [camps@villagecamps.com](mailto:camps@villagecamps.com)  
[www.villagecamps.com](http://www.villagecamps.com)
- Alpadia Language Schools:  
Grand-Rue 42, PO Box 1206, 1820 Montreux  
Tel: +41 21 621 88 88  
Email: [info@alpadia.com](mailto:info@alpadia.com)  
<https://www.alpadia.com/fr/>
- Carol Panchaud Educom sàrl:  
26 Route of Givrins, CH - 1276 Gingins  
Tel: +41 22 776 69 15  
Email: [carolpanchaud@educom.ch](mailto:carolpanchaud@educom.ch)  
<http://educom.ch/fr>
- Caritas-Youth:  
11, Jean-Violette Street, 1205 Geneva  
Tel: +41 22 708 04 04  
Email: [info@caritas-jeunesse.ch](mailto:info@caritas-jeunesse.ch)  
<http://www.caritas-jeunesse.ch/>
- Holiday Camp St. Gervais:  
CP 1337, 1211 Geneva 1  
Tel: +41 78 896 71 84  
Email: [info@colonie-saint-gervais.ch](mailto:info@colonie-saint-gervais.ch)  
<http://www.colonie-saint-gervais.ch/>
- Summer Camp of Ravoire - Camp Plein Soleil:  
PO Box 87, CH-1920 Martigny 1  
Email: [info@camp-pleinsoleil.ch](mailto:info@camp-pleinsoleil.ch)
- Yverdon-les-Bains youth service and social cohesion:  
Rue de Neuchâtel 2, 1400 Yverdon-les-Bains  
Tel: +41 24 423 69 11  
Email: [vacances@yverdon-les-bains.ch](mailto:vacances@yverdon-les-bains.ch)  
<http://www.yverdon-les-bains.ch/prestations-deladministration/jeunesse-et-cohesion-sociale/enfanceetfamille/colonies-dete-et-dautomne/>
- fRilingue GmbH:  
Stöckackerstrasse 93, 3018 Bern  
Tel: +41 26 321 34 34

Email: [info@frilingue.com](mailto:info@frilingue.com)

- Star Sports:  
Path of Verger 2, PO Box 101, 1304 Cossonay-Ville  
Tel: +41 79 356 44 61  
Email: [info@starsports.ch](mailto:info@starsports.ch)  
<http://www.starsports.ch/>
- Cap Loisirs Foundation:  
34, Boulevard de Saint-Georges, 1205 Geneva  
Tel: +41 22 731 86 00  
Email: [caploisirs@caploisirs.ch](mailto:caploisirs@caploisirs.ch)  
<http://www.caploisirs.ch/>
- SCE Holidays & Events:  
Rue de Lausanne 58, 1950 Sion  
Tel: +41 79 693.33.64  
Email: [info@lescamps.ch](mailto:info@lescamps.ch)  
<https://www.lescamps.ch/>