Online opportunities and risks for children and adolescents: The role of digital skills, age, gender and parental mediation in Brazil

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Abstract

This article presents a study that applies integrated and multi-factor path analysis to report the direct and indirect effects of young Brazilian individual and home factors on their online opportunities and risks. The results show that engaging in more online opportunities, being older and having a lower level of parental mediation are associated with a higher number of online risks. At the same time, being older, having Internet access at home, having parents with a higher educational level, possessing more digital skills and receiving a higher level of co-use and active parental mediation are positively associated with online opportunities. Although restrictive parental mediation is negatively associated with online risks, it also reduces opportunities. In addition, co-use and active mediation are positively associated with parental educational level. These findings offer a starting point to understand children's online behaviour and digital inclusion in Latin America and analyse its differences with other regions.

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Introduction

A significant number of young people have grown up with the Internet and digital devices as part of their everyday lives (Erstad, 2012; Facer et al., 2003; Furlong and Davies, 2012; Livingstone et al., 2011; Livingstone and Helsper, 2007). Researchers, policy makers and other stakeholders have focussed on the opportunities and risks that the Internet can offer to children and young people, and on the factors that may facilitate or condition them (Hasebrink et al., 2009).

The type of activities children engage in online cannot 'be described as "beneficial" or "harmful", because such judgments depend on the outcome of the activity rather than the activity itself' (Livingstone et al., 2011: 14). However, some activities are more likely to lead to beneficial outcomes, while others will increase the likelihood of harm (Livingstone et al., 2011). The former can be conceptualised as online opportunities and the latter as online risks. Hasebrink et al. (2009) claim that although opportunities and risks are a moving target, they can be associated with certain activities: online opportunities can include access to global information, educational resources, entertainment, social networking with friends, privacy for the expression of identity, content creation and civic or political participation, while online risks include illegal content or activities, sexual violence, bullying, invasions of privacy, offensive content, biased information and contacting and meeting strangers.

As Livingstone and Helsper (2010) emphasise, there is a lack of research analysing the multiple and integrated factors associated with young people's Internet use considering online risks and opportunities, which are commonly studied separately. Furthermore, the focus has been placed more on online risks and safety (Smahel and Blinka, 2012) and how children cope with online risks (Vandoninck et al., 2013). Since those who encounter more opportunities also tend to face more risks online (Livingstone and Helsper, 2010), it is important to consider both aspects, especially to avoid concluding that certain factors reduce risks without accounting for their possible negative effect on opportunities.

In addition to the importance of access, frequency of use and time spent online, evidence supports an association between personal factors such as age, gender, digital skills, emotional and psychological characteristics and online opportunities and risks (Helsper et al., 2013; Livingstone and Helsper, 2010; Sasson and Mesch, 2014; Smahel and Blinka, 2012). Sociocultural factors such as socioeconomic status (SES), educational resources and parental mediation of Internet use have also been found to be strongly associated with opportunities and risks (Cho et al., 2003; Hargittai, 2010; Helsper et al., 2013; Lee and Chae, 2007; Livingstone and Helsper, 2010; Robinson et al., 2003). Among these, factors such as digital skills and parental mediation of Internet use are especially relevant since they are subject to public policy intervention.

The purpose of this study is to contribute to the development of a new research approach, analysing multiple and integrated factors associated with young people's Internet use

(Livingstone and Helsper, 2010). Considering that research in this area has developed more in the Northern Hemisphere (Livingstone and Bulger, 2013), this study aims to contribute to the understanding of how these phenomena arise in a Latin American country. Internet users have rapidly increased in Latin America in the past decade – on average, from 10.5% to 46.2%. In contrast, in the United States and the United Kingdom, the increase during this time was smaller but reached a significantly higher proportion of users (from 65% to 87% and from 66% to 92%, respectively; International Telecommunication Union [ITU], 2015). Despite the fast increase in access, studies in Latin America related to the impact of digital technologies in people's everyday lives, particularly that of children, are still scarce. In this sense, Brazil, as the first country to offer international comparable data on children's uses, opportunities and risks in the region, is an interesting case to study. Nevertheless, to further understand this phenomenon in Latin America and analyse its differences with Europe or other regions, data from more countries are necessary. This will be possible in the near future, as new Latin American countries are increasingly implementing the Kids Online survey, including Argentina in 2015–2016, Chile in 2016 and Uruguay in 2017 (http://blogs.lse.ac.uk/gko/results/).

In Brazil, children face inequalities and specific features in their *digital ecology*, as a complex and multilevel phenomenon, that are closely related to opportunities and risks (Cabello et.al., 2016). Based on Brofenbrenner's (2005) ecological model, Livingstone et al. (2015a) claim that in order to frame children's use of digital media, it is necessary to adopt a *digital ecology* approach defined by at least two systemic levels. First, the level of family dynamics and personal beliefs of parents and children, and second, the level of structural factors such as income, access to technology and cultural values.

The case of Brazil

Between 2004 and 2014, Internet users (some who used the Internet in the past 3 months) increased in Brazil from 19% to 55% (ITU, 2015). Access and use of information and communication technology (ICT) are highly determined by the area where people live and their SES (Paus-Hasebrink et al., 2014). In fact, 98% and 80% of the households of two highest SES groups, respectively, have Internet access at home versus an 8% of the lowest SES group households (CGI.br, 2014). The proportion of young Internet users in Brazil is 75% among 10–15-year-olds and 77% among 16–24-year-olds. Despite this relatively high proportion of users, one out of four children or teens is excluded from the Internet (CGI.br, 2014; Sozio et al., 2015). The proportion who uses the Internet daily is 77% of high SES children, 62% of medium SES children and only 32% of low SES children (Sozio et al., 2015). Therefore, Brazil still faces an important challenge regarding the universalisation and democratisation of access and use of the Internet (Barbosa et al., 2013).

Literature review

Opportunities and risks online

Children's Internet use has been amply studied and classified. Many of these classifications are based on children's motivations and frequency of use and come up with

generally similar categories: entertainment, communication, information seeking and productivity, among others (Facer et al., 2003; Furlong and Davies, 2012; Hinostroza et.al., 2014; Ito et.al., 2008; Johnson, 2010). Nevertheless, most of these studies have limited to describe children's uses without considering the consequences or potential consequences of the use of the Internet. Livingstone et al. (2011) propose that types of Internet use can be understood as online opportunities and risks. The activities that are more likely to turn into beneficial outcomes can be classified as opportunities, while those that are more likely to turn into harmful or disturbing outcomes as risks. Online opportunities can bring risks, and online risks may or may not turn into negative experiences or harm (Livingstone and Bulger, 2013).

There is a vast scholarship on the risks and negative experiences that children can encounter by using the Internet such as cyberbullying, online grooming, unwanted sexual material, or excessive use or Internet addiction (Aboujaoude et al., 2015; Kowalski et al., 2014; Mitchell et al., 2003; Smahel and Blinka, 2012; Whittle et al., 2012). However, research on online opportunities is scarce and more recent.

Evidence shows that older children engage in more online opportunities (Livingstone and Helsper, 2010) and also tend to face more risks (Livingstone and Helsper, 2008; Mitchell et al., 2003; Sasson and Mesch, 2014). Age also has an indirect effect on risks, mediated not only by access and use but also by digital skills (Livingstone and Helsper, 2010).

In general, boys tend to encounter more risks than girls (Mitchell et al., 2003; Sasson and Mesch, 2014), even disregarding their skill level (Livingstone and Helsper, 2010). Boys also tend to engage in more opportunities online, although gender intersects with age: as children get older, the gender gap widens in terms of diversity and amount of use (Livingstone and Helsper, 2007). The type of risks children and teenagers face online is also differentiated by gender. Livingstone et al. (2011: 6) found that boys are more exposed to sexual images online, while it is more common for girls to receive hurtful messages and also to be upset by the risks they experience. However, the evidence in being a victim of cyberbullying based on gender differences is mixed (Aboujaoude et al., 2015; Kowalski et al., 2014).

In relation to SES, there is some evidence about its association with different types of Internet use, specifically in terms of enhanced life chances (Robinson et al., 2003) and gratifications gained from Internet use (Cho et al., 2003). Also, the SES can be a strong predictor of the way people engage on the Internet, where those with a higher SES tend to use it in a more diverse and informed way (Hargittai, 2010). Livingstone and Helsper (2010) found that middle-class teenagers benefit more from online opportunities than working-class teenagers. However, SES did not have a direct effect on opportunities or risks but rather it was mediated by access.

Finally, parental education is also a relevant factor in explaining children's online risks and opportunities. Parents with less education tend to apply more restrictive technical mediation (Sonck et al., 2013), while more educated parents apply more active mediation (Paus-Hasebrink et al., 2012).

Digital skills

Digital skills are a set of abilities required for information society (Van Dijk and Van Deursen, 2014). They are not homogeneously distributed, generating the so-called

second-level digital divide (Hargittai and Hinnant, 2008; Organisation for Economic Co-operation and Development [OECD], 2011).

Age, gender and SES have been found to be associated with digital skills. Research shows that less-educated and/or lower-income people tend to have lower levels of digital skills (Aesaert and Van Braak, 2015; Correa, 2015; Hargittai, 2010; Van Deursen and Van Dijk, 2010). Regarding gender, some evidence shows that girls have higher levels of digital skills (technical- and higher-order skills; Aesaert and Van Braak, 2015), and regarding age, older children tend to have higher skill levels, irrespective of access or use (Livingstone and Helsper, 2010).

Parental mediation of Internet use

Research has reported different parental mediation strategies related to media. The most commonly reported strategies include active, restrictive and co-viewing (Nathanson, 1999) as well as co-use mediation (Livingstone and Helsper, 2008; Valkenburg et al., 1999). Valkenburg et al. (2013) recently developed a validated model to evaluate the adolescents' perceptions on restrictive and active parental mediation. They found that these perceptions are more diverse than most researchers assume. Restrictive mediation can be perceived not only as a way to control but also as a supportive mediation style. Meanwhile, active mediation can be perceived as a way to control. The authors discuss that parental mediation has not been properly analysed yet, considering the wider context of parental styles.

The European Union (EU) Kids Online framework defines and measures five types of parental mediation on which this study is based: (1) active or instructive mediation: talking about media content while the child is online; (2) restrictive mediation: setting rules that restrict the use of the medium; (3) co-using: remaining present while the child is online, thus sharing the experience but without commenting on the content or its effects; (4) monitoring: checking children's online activities afterwards; and (5) restricting by technical bans or filters: using software and configurations for time control and to ban or filter specific content (Dürager and Sonck, 2014). Although this classification of types of mediation differentiates between various practices, it is still limited as it does not incorporate the nuances of how these practices are taking place or being perceived by the child.

In relation to SES, research has shown that students' online activity is shaped by their parents' differential access to what Bourdieu (1986) calls economic and cultural capital and also by their different experiences with technology (Hollingworth et al., 2011). In wealthier families, parents tend to have more experience with technology and to be more digitally skilled, providing their children with more guidance and support than in less wealthy families (Vekiri, 2010: 947).

As children get older, parents reduce the frequency and diversity of the mediation practices (Livingstone and Helsper, 2008; Nikken and Jansz, 2014; Sonck et al., 2013; Valcke et al., 2010). Data regarding the relationship between gender and the amount or type of parental mediation are mixed. Some research has found that the child's gender has no association with the overall amount of parental mediation (Livingstone and Helsper, 2008), while others have found that girls are more subject to parental mediation

than boys (Nunes De Almeida et al., 2012; Sonck et al., 2013), and others have found the inverse (Nikken and Jansz, 2014).

Digital skills and online risks and opportunities

Digital skills play a significant role in Internet use (Eastin and LaRose, 2000; Hargittai and Hinnant, 2008; Van Dijk and Van Deursen, 2014). Evidence shows that they play a direct role not only in online opportunities but also as a mediator between those opportunities and the effect of sociodemographic factors and access (Hargittai and Hinnant, 2008; Livingstone and Helsper, 2007, 2010).

Digital literacy is associated with both opportunities and risks encountered online (Livingstone and Helsper, 2010). Specifically, it is important in terms of online coping strategies when encountering upsetting situations (Vandoninck et al., 2013) and in whether certain uses become a harmful negative experience or an opportunity (Smahel and Blinka, 2012; Vandoninck et al., 2013).

Parental mediation and risks and opportunities online

A supportive style of mediation is associated with a safer (Fleming et al., 2006) use of the Internet and also with more positive interactive behaviour online (Lee and Chae, 2007). Norms, such as time of use or websites that children can visit, seem ineffective (Lee and Chae, 2007; Vandoninck et al., 2013). As Livingstone and Helsper (2010) show, restricting Internet use with the aim of reducing risks will most likely also reduce opportunities. Similarly, 'countries with the highest proportion of restrictive mediation practices are not systematically lower risk and harm countries' (Helsper et al., 2013: 36).

Parental mediation and digital skills

There is a lack of evidence regarding the possible effect that any parental mediation of Internet use can have on the digital literacy level of children or teenagers. However, the EU Kids Online study shows that active monitoring and technical parental mediation of the Internet are positively associated with digital skills, while restrictive mediation is negatively associated (Dürager and Livingstone, 2012; Livingstone et al., 2015b).

Hypothetical model

Most of the studies reviewed did not perform an integrated and complex analysis. For this study, we develop a multivariate approach, integrating a wider range of variables. The following questions drove this research:

> *RQ1*. What is the association between young Internet users' demographics (age and gender), home factors (Internet access at home, parental education, parental Internet use), parental mediation of Internet use and digital skills and the number of their online opportunities and risks?
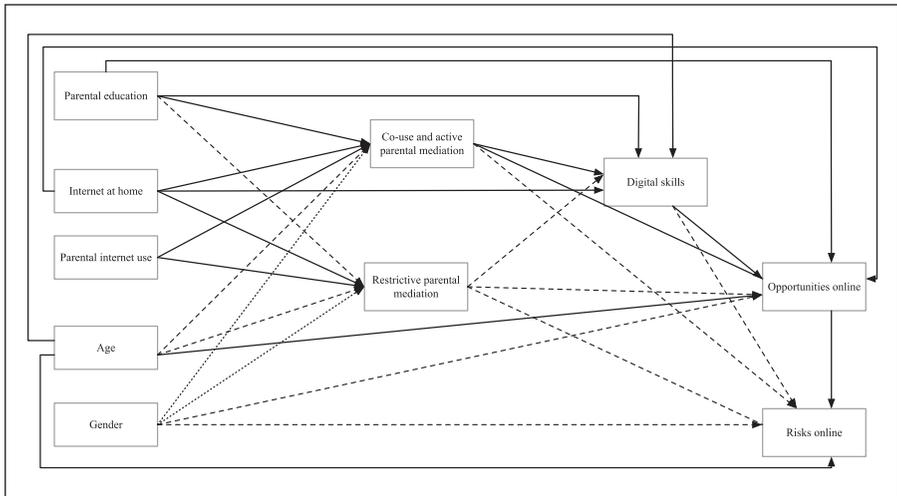
Figure 1. Hypothesised model for young internet users' online opportunities and risks.

> *RQ2*. What is the association between young Internet users' demographics, home factors, parental mediation of Internet use and their level of digital skills?

> *RQ3*. What is the association between young Internet users' demographics, home factors and parental mediation of their Internet use?

The literature review presented above forms the basis for the hypotheses presented in Figure 1. The directions of the hypothesised associations are represented by arrows: solid for positive, dashed for negative and dotted for unknown.

Data and method

Sample

Data for this study drew on the Kids Online Brazil project applied for the second time in 2013 by the Regional Centre for Studies on the Development of the Information Society (Cetic.br). The sample included 2261 children and adolescents who are Internet users aged between 9 and 17 years and 2261 parents or guardians (one per child interviewed). Internet users were defined as people who had used the Internet at least once during the last 3 months, following the ITU (2015) definition. The survey followed a four-stage cluster sampling method with a probability proportional to size (PPS) selection and stratification of municipalities and census enumeration areas and, lastly, systematic selection of households and simple random sampling of children. Probability weights consider this selection method. For methodological details about the survey, see Cetic.br (2014).

For this study, the analytical sample consisted of 1694 Brazilian children and teenagers aged 11 to 17 years. The 9–10-year-old group was not included since measures for digital skills were not collected for this group.

Measures

A full description of the measures included in the path model is presented in Table 1. The correlations between the standardised continuous variables are presented in Table 2. All the data used in this analysis were collected through the children's questionnaire unless stated otherwise.

Table 1. Observable variables in the model.

Exogenous variables		Mean (%)	SD	Min	Max
Gender	Boy (reference category)	43.9	–	–	–
	Girl	56.1	–	–	–
Age group (years)	Younger age (11–12) (reference category)	23.9	–	–	–
	Middle age (13–14)	27	–	–	–
	Older age (15–17)[a]	49.2	–	–	–
Highest parental educational level achieved	Eight categories, from pre-school or illiterate up to complete tertiary education. Reported by the parent/guardian both for themselves and for that of the child's other main caregiver. Following OECD (2011), the highest educational level among both parents/guardians was used.	4.87	2.09	1	8
Internet at home	This excludes Internet access via a mobile phone.				
	No (reference category)	26.3			
	Yes	73.7			
Parents' Internet use	Reported by the parent/guardian.				
	No (reference category)	48.4			
	Yes	51.6			
Active and co-use parental mediation of Internet use	All items were grouped as one variable ($\alpha = .89$), summing the items where the child answered 'yes': *When you use the Internet does your parent/carer …?*	5.20	3.38	0	10
	Active mediation: Talk to you about what you do on the Internet; Encourage you to explore and learn things on the Internet on your own; Sit with you while you use the Internet (watching what you are doing but not really joining in); Stay nearby when you use the Internet; Do shared activities together with you on the Internet. Co-use mediation: Helped you when something is difficult to do or find on the Internet; Suggested ways to use the Internet safely; Explained why some websites are good or bad; Suggested ways to behave towards other people online; In general, talked to you about what you would do if something on the Internet ever bothered you.				

Table 1. (Continued)

Exogenous variables		Mean (%)	SD	Min	Max
Restrictive parental mediation of Internet use	All items were grouped as one variable (α = .85), summing the items where the child answered 'yes'[b]: *For each of these things, please indicate if your parent(s)/carer(s) CURRENTLY let you perform them whenever you want, or let you do them but only with your parent'(s)/carer'(s) permission or supervision, or NEVER let you do them.* Have your own social networking profile; Give out personal information to others on the Internet (e.g. my full name, address or phone number); Use instant messaging; Download music or films on the Internet; Watch video clips on the Internet (e.g. on YouTube); Upload photos, videos or music to share with others.	2.96	2.21	0	8
Digital skills	The self-reported capacity of the child to do a number of tasks comprising operational, formal, information navigation and social skills (Van Dijk and Van Deursen, 2014; Van Deursen et al., 2015). All items were grouped as one variable (α = .85), summing the items where the child answered 'yes': *Do you know how to …?* Compare different websites to decide if information is true; Change filter preferences (by this we mean change the way that your computer or Internet browser filters or selects which websites you can or cannot see); Bookmark a website (add to Favourites); Block unwanted adverts or junk mail/spam; Delete the record of which sites you have visited; Change privacy settings on a social networking profile. By this, I mean the settings that decide which of your information can be seen by other people on the Internet; Block messages from someone you don't want to hear from. By this, I mean, use the settings that let you stop someone else contacting you on the Internet; Find information on how to use the Internet safely.	3.84	2.70	0	8
Online opportunities	Number of Internet activities that involve information, communication, participation or entertainment (last 1-month period). All items were grouped as one variable (α = .77), summing the items where the child answered 'yes': Used the Internet for school work; Read/watched the news on the Internet; Send or receive emails; Used instant messaging such as WhatsApp or Facebook chat to exchange messages with friends;	7.20	3.30	0	16

(Continued)

Table 1. (Continued)

Exogenous variables		Mean (%)	SD	Min	Max
	Visited a social networking profile like Facebook, Orkut, and so on; Visited a chat room, excluding Facebook; Made or received phone calls or video calls on the Internet (e.g. Skype); Watched video clips (e.g. on YouTube); Downloaded music or films; Bought things online; Played games with other people on the Internet; Played games alone on the Internet; Put (or posted) a message on a website; Written a blog or online diary (e.g. Blogger or Twitter); Put (or posted) photos, videos or music to share with others on social networking; Put (or posted) photos, videos or music to share with others on instant messaging such as WhatsApp.				
Online risks	Number of Internet activities that comprise a risk of feeling upset, uncomfortable, or of being harmed (last 12 month period). All items were grouped as one variable ($\alpha = .74$), summing the items where the child answered 'yes': Someone has acted in a hurtful or nasty way to you in the Internet; Acted in a hurtful or nasty way to someone in the Internet; Met anyone face to face that you first met on the Internet; Seen or received sexual messages of any kind on the Internet; Sent or posted a sexual message (example: words, pictures or video) of any kind on the Internet? This could be about you or someone else. *Have you done the following things in the past 12 months?* [c] Looked for new friends on the Internet; Sent personal information (e.g. full name, address or phone number) to someone that I have never met face to face; Added people to my friends list or address book that I have never met face to face; Pretended to be a different kind of person on the Internet from what I really am; Sent a photo or video of myself to someone that I have never met face to face; Had contact on the Internet with someone you have not met face to face before.	1.75	1.89	0	9

OECD: Organisation for Economic Co-operation and Development; *SD*: standard deviation.

[a]The data available were in age groups instead of years of age.

[b]These items were originally ordinal but were dichotomised in terms of non-restriction ('can do this anytime') and any type of restriction ('can only do with permission or supervision' and 'can never do this'). This also allowed having the same scale for both types of mediation.

[c]These items are originally ordinal: 'Many times', 'Sometimes' and 'No', but were dichotomised (the first two categories were merged) in order to use the same scale for opportunities and risks.

Table 2. Correlation matrix for continuous standardised variables.

	1	2	3	4	5
1. Online risks	–	–	–	–	–
2. Online opportunities	.46**	–	–	–	–
3. Digital skills	.34**	.48**	–	–	–
4. Co-use and active parental mediation	−.02	.24**	.16**	–	–
5. Restrictive parental mediation	−.22**	−.28*	−.17**	.21**	–
6. Parental educational level	.01	.28**	.25**	.44**	.03

**p < .01

The parental mediation measures are conceptualised and validated by Dürager and Sonck (2014) in a European sample. Originally these questions were intended to the different types of mediation separately (active, co-use and restrictive). However, an exploratory factor analysis using tetrachoric correlations showed the existence of two main factors (factor 1: eigenvalue=7.52, 42% of variance explained; factor 2: eigenvalue=4.94, 28% of variance explained) where all items of active and co-use mediation grouped in factor 1 and all items of restrictive mediation grouped in factor 2.

Path model estimation

A structural equation model (SEM) was fit to the data, using a path analysis model with observable endogenous and exogenous variables. Due to the non-normal distribution of some of the endogenous variables, the model was fit using the maximum likelihood method (MLM) estimator, where standard errors and chi-square tests are robust to non-normality (Rossel, 2012). This method allows for the modelling of correlated error terms, several endogenous variables and estimation of direct and indirect effects (Bollen, 1989). Recently, research on the digital divide has used the SEM methodology (Livingstone and Helsper, 2010; Van Deursen and Van Dijk, 2015), obtaining relevant results which were taken into account in the model hypothesised for this study.

The analyses were performed using the *lavaan* (Rossel, 2012) and *lavaan.survey* (Oberski, 2014) packages with R software (R Core Team, 2015). All analyses were conducted with the corresponding probability weights.

Results

The model was first fit applying all the associations presented in the hypothesised model (Figure 1), but the model fit statistics were not acceptable ($\chi^2[7]=48.16$, $p<.001$; root mean square error of approximation [RMSEA]=.059; comparative fit index [CFI]=.961; Tucker-Lewis index [TLI]=.780). After checking the modification indices, the covariance between co-use and active mediation and restrictive parental mediation was included in the estimation. This resulted in a final model with a good fit, represented in Figure 2 ($\chi^2[6]=9.41$, $p<.152$; RMSEA=.018; CFI=.997; TLI=.979). This model has acceptable fit statistics, allowing for the interpretation of the coefficient estimators. A
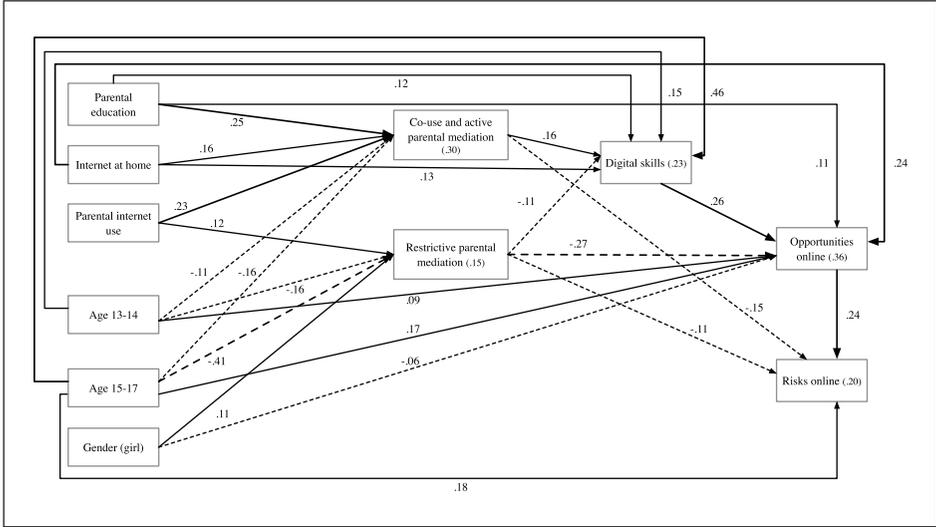
Figure 2. Path model for online opportunities and risks.
Note: Standardised estimates are displayed. R^2 for the endogenous variables are in parentheses. The signs of the associations are represented by different arrows: solid for positive and dashed for negative. For clarity, non-significant paths (p>=0.1) were omitted from the figure. All path coefficients >=0.20 are thicker to represent importance.

third model was fit by fixing the non-significant paths to zero, and while the CFI improved significantly, for the other indices the non-fixed model had a better fit. Thus, the final model was adjusted without fixing the parameters. All endogenous variable variances were estimated but were omitted from the tables.

Effects on online opportunities and risks (RQ1)

The direct effects on risks and opportunities are presented in Tables 3 and 4, respectively. The hypothesis that online opportunities are associated with online risks is confirmed, and it is the strongest direct path to online risks. Another significant direct path to online risks is belonging to the older-age group (15 to 17 years) in comparison to belonging to the younger-age group (11 to 12 years). Belonging to the middle-age group (13 to 14 years) had no significant effect in comparison to the younger age group.

The hypothesis of a negative association between being a girl and online risks was not confirmed. However, there is an indirect path between gender and online risks, mediated by online opportunities (Table 5). In other words, the fact that girls tend to engage in less online opportunities reduces their chances of experiencing risks.

The hypotheses regarding the negative effect of both types of mediation were confirmed. Interestingly, the direct effect of co-use and active mediation is slightly stronger than the effect of restrictive mediation. Digital skills turned out to have a non-significant direct association with online risks; however, they did have an indirect effect mediated

Table 3. Direct effect on online risks.

Predictor variable	Online risks			
	b	SE	*p* (>|z|)	*b* SD
Aged 13–14 years	.06	.08	.44	.03
Aged 15–17 years	.36	.10	**	.18
Gender	.07	.07	.29	.04
Online opportunities	.25	.05	**	.24
Digital skills	.05	.04	.19	.05
Co-use/active mediation	−.15	.04	**	−.15
Restrictive mediation	−.10	.04	**	−.11

SE: standard error; SD: standard deviation.
**p<.01.

Table 4. Direct effect on online opportunities.

Predictor variable	Online opportunities			
	b	SE	*p* (>|z|)	*b* SD
Parents' educational level	.05	.02	**	.11
Aged 13–14 years	.18	.07	*	.09
Aged 15–17 years	.31	.08	**	.17
Gender	−.12	.06	*	−.06
Internet access at home	.45	.07	**	.24
Digital skills	.25	.03	**	.26
Co-use/active mediation	.05	.03	.15	.05
Restrictive mediation	−.24	.03	**	−.27

SE: standard error; SD: standard deviation.
**p<.01; *p<.05.

Table 5. Specific indirect path coefficients.

Specific indirect paths	*b*	SE	*p* (>|z|)	*b* SD
Gender→ online opportunities→ online risks	−.03	.02	*	−.02
Digital skills→ online opportunities→ online risks	.06	.01	**	.06
Co-use/active mediation→ digital skills→ online opportunities	.04	.01	**	.04

SE: standard error; SD: standard deviation.
**p<.01; *p<.05.

by online opportunities (Table 5). This means that a higher level of digital skills increases opportunities which may increase risks.

The number of online opportunities is the endogenous variable with the highest percentage of variance explained in the model. The three strongest direct effects on online

Table 6. Total effects over online opportunities and risks.

	Online opportunities				Online risks			
	b	SE	*p* (>|z|)	*b SD*	*b*	SE	*p* (>|z|)	*b SD*
Gender	−.11	.06	.06	−.06	.00	.00	*	.00
Aged 13–14 years	.19	.07	*	.09	.00	.00	.26	.00
Aged 15–17 years	.31	.08	**	.17	.36	.10	**	.18
Parents' educational level	.06	.02	**	.12	.00	.00	1.2.2 *	.00
Internet access at home	.47	.07	**	.25	.01	.00	**	.00
Parent's Internet use	.01	.01	*	.01	.00	.00	*	.00
Co-use/active mediation	.04	.01	**	.04	−.14	.04	**	−.14
Restrictive mediation	−.27	.03	**	−.30	−.11	.04	**	−.12
Digital skills	.25	.03	**	.26	.06	.01	**	.06
Online opportunities	–	–	–	–	.25	.05	**	.24

SE: standard error; SD: standard deviation.
**$p < .01$; *$p < .05$.

opportunities are from restrictive mediation, which has a negative effect, and from Internet access at home and digital skills, which both have a positive effect. Co-use and active mediation have no direct significant effect on online opportunities; however, they have a significant indirect effect when mediated by digital skills. In other words, this type of mediation may increase the level of digital skills resulting in a higher engagement with online opportunities. Belonging to either of the older age groups and a higher parental education are both positively associated with opportunities. Finally, girls tend to engage in fewer online opportunities.

When looking at the total effects (sum of all direct and indirect effects on each variable) presented in Table 6, we confirm the importance of the effect of online opportunities, age and parental mediation on online risks. When looking at the total effects on opportunities, we confirm that restrictive mediation reduces opportunities and that Internet access at home and a higher level of digital skills increases opportunities.

Effects on digital skills (RQ2)

Age has a strong effect on digital skills, especially when comparing the older age group (15 to 17 years) with the younger group (11 to 12 years; Table 7). As hypothesised, co-use and active mediation are positively associated with digital skills, while restrictive mediation is negatively associated. In addition, Internet at home and parental educational level have positive direct effects on digital skills.

Effects on parental mediation of Internet use (RQ3)

As hypothesised, parental mediation of Internet use is negatively associated with age, irrespective of the type of mediation (Table 8). However, restrictive mediation tends to be especially reduced for the older age group (15 to 17 years), with a coefficient almost three

Table 7. Direct effect on digital skills.

Predictor variable	Digital skills			
	b	SE	*p* (>|z|)	*b SD*
Parents' educational level	.06	.02	**	.12
Aged 13–14	.33	.10	**	.15
Aged 15–17	.93	.09	**	.46
Internet access at home	.26	.08	**	.13
Co-use/active mediation	.17	.04	**	.16
Restrictive mediation	−.11	.04	**	−.11

SE: standard error; *SD*: standard deviation.
**p < .01.

Table 8. Direct effects on parental mediation.

Predictor variable	Co-use/active mediation				Restrictive mediation			
	b	SE	*p* (>|z|)	*b SD*	*b*	SE	*p* (>|z|)	*b SD*
Parents' educational level	.12	.02	**	.25	.02	.02	.44	.03
Aged 13–14 years	−.23	.08	**	−.11	−.37	.11	**	−.16
Aged 15–17 years	−.31	.07	**	−.16	−.87	.10	**	−.41
Gender	.10	.06	.10	.05	.23	.07	**	.11
Internet access at home	.32	.07	**	.16	−.21	.09	.10	−.10
Parent's Internet use	.46	.08	**	.23	.26	.09	**	.12

SE: standard error; *SD*: standard deviation.
The covariance between both types of mediation is 19 (SE = .03).
**p < .01; *p < .05.

times the negative association between belonging to that group and co-use and active mediation. The hypothesis that being a girl is positively associated with both types of mediation was confirmed only for restrictive mediation. Having Internet access at home tends to be associated with a higher level of co-use and active mediation, while it has a non-significant effect on restrictive mediation. Again as hypothesised, parental Internet use is positively associated with both types of mediation, although it is stronger for co-use and active mediation. In addition, parental education has a significant effect on co-use and active mediation, although not on restrictive mediation. Finally, it is relevant to observe that the covariance between both types of mediation residual is significant. This could be interpreted as relating to other factors, such as parenting style, that were not measured.

Discussion and conclusion

The aim of this study was to understand the factors associated with the way children use the Internet in Brazil, considering the direct and indirect effects of sociodemographics, Internet access, parental mediation and digital skills on both online opportunities and risks.

The results confirmed many of the previous findings from the *Global North*. Nevertheless, most of them modelled the effect of only some of the predictor variables included in this study. The contribution of this study is testing the persistence of these associations in a more complex model and in a Latin American country.

The result that online opportunities seem to be associated with online risks is consistent with the results of Livingstone and Helsper (2010), and it strengthens the relevance of analysing them together and of revising the factors associated with them.

Our findings confirm the relevance of personal characteristics in online opportunities and risks – age, gender and digital skills seem to shape children's and adolescent's experiences on the Internet. As in previous studies (Livingstone and Helsper, 2008; Sasson and Mesch, 2014), older teenagers engage in more online risks than younger children, and older children engage in more opportunities (Livingstone and Helsper, 2010). Considering that younger children tend to be more receptive to parental intervention, while older children often perceive mediation as an invasion of privacy (Smahel and Wright, 2014), age should be crucial in the discussion regarding parental mediation, opportunities and risk policies.

Contrary to prior findings (Livingstone and Helsper, 2010; Sasson and Mesch, 2014; Vandoninck et al., 2013), gender and digital skills seem not to have a direct influence on online risks but rather operate through online opportunities. Brazilian boys are more likely to engage in opportunities online, which results in a greater likelihood of encountering risks. On the contrary, the level of digital skills increases online opportunities, leading to an increase in online risks. The lack of direct relationship of digital skills with risks may be explained by the indicators used in this survey to measure digital skills, which are more focussed on managing opportunities than risks.

We also found that family factors, such as parental educational level and parental Internet use, are important mainly due to their influence through parental mediation. The finding that parental mediation seems to be reducing the number of risks is consistent with some previous studies (Fleming et al., 2006; Lee and Chae, 2007; Valcke et al., 2007) and contrary to others in Europe (Helsper et al., 2013; Livingstone and Helsper, 2008). The latter studies showed that increasing mediation did not necessarily reduce risks and also that countries with higher restrictive mediation did not have lower levels of online risk. In Brazil, both types of mediation were found to be negatively associated with the amount of online risks, although co-use and active mediation had a stronger effect compared to restrictive mediation. Co-use and active mediation do not have a direct effect on online opportunities, but as they are positively associated with the level of digital skills, they may increase the online opportunities indirectly. The fact that restrictive mediation reduces risks but also reduces opportunities questions the effectiveness of restrictive mediation on helping children and adolescents with an overall positive online experience. However, this should be further explored considering personal and/or cultural factors that have been found to affect this association (Kirwil, 2009; Lee, 2012).

Parents who use the Internet tend to practice more mediation with their children, especially co-use and active mediation. These parents may be more self-conscious about the different opportunities and risks online and tend to prefer explaining and discussing the media content and/or sharing media activities with their children rather than restricting their use.

Higher educated parents seem to practice more co-use and active parental mediation. However, parental education did not have a significant effect on restrictive mediation. This is consistent with European findings (Dürager and Livingstone, 2012; Livingstone et al., 2011). As Livingstone et al. (2015b) noted, highly educated parents seem to be replacing regulatory approaches with more supportive styles that encourage the child's empowerment.

These results suggest that co-use and active parental mediation are in some way related to the cultural capital of the family, as defined by Bourdieu (1986). It could be hypothesised that through active or co-use mediation practices, parents are transmitting to their children a certain *cultural capital* in the form of advice, criteria and guidelines on Internet use, as proposed by Frow and Emmison (1998). Children with higher educated parents also engage in more online opportunities and have higher levels of digital skills. Thus, children from more highly educated families could be benefiting from Internet use to a greater extent than those who have fewer resources, resulting in increased inequality (De Haan, 2004). This result is particularly relevant for digital inclusion policies in Brazil and other Latin American countries, which tend to focus only on providing access and promoting Internet use. Social and especially educational policies in these countries should also work on implementing school and teacher Internet mediation strategies and on developing children's digital skills. Otherwise, as these findings suggest, digital opportunities may potentially become a new source of inequality and could even result in the 'amplification' of existing social and cultural inequalities (Toyama, 2011).

In addition, we found that a structural factor, Internet access at home, was associated with a greater number of online opportunities. This finding, in addition to the importance of parental education, shows that the socioeconomic characteristics at home are still an important condition for online opportunities (Livingstone and Helsper, 2010). This represents a relevant gap in a country like Brazil where Internet access is far from universal and there are important social inequalities. On the contrary, the importance of digital skills on online opportunities is consistent with previous findings in Europe and North America (Eastin and LaRose, 2000; Hargittai and Hinnant, 2008; Van Dijk and Van Deursen, 2014).

Finally, a general overview of the results of this model shows that as in other contexts of child development, access to material resources, parents' education and mediation role, and children's skills are all important factors in the digital context. More specifically, parents who dedicate more time to active and co-use can provide more opportunities for their children. These parents also tend to be more skilled and more educated, which is a very important finding facing the inequalities in Brazil and other countries in the Global South. These results support the importance of adopting an ecological perspective that combines personal, family, cultural and structural factors to study this phenomenon. At the same time, they stress the need to design overarching policies to support children's development and well-being in the digital environment.

Some limitations of this study should be considered. First, the use of SEM posed some methodological challenges when using survey weights. Second, digital skills were based on a self-report rather than actual achievement, which could be reflecting other personal characteristics such as self-efficacy and social desirability, leading to an over or underestimation of the skill level. Third, the influence of teachers or peers was

not considered, which may be obscuring the way that other socialisation agents shape children's experiences on the Internet. Fourth, information on technical and monitoring mediation was only available for children with Internet access at home, and therefore these types of mediation were not included in the analysis. Fifth, the mediation measures available fail to incorporate the nuances of the parenting style, possibly hiding restrictive but supportive or active but controlling types of mediation (Valkenburg et al., 2013). Future studies should also consider these extended frameworks to study parental mediations. Finally, the definition of risks and opportunities only refers to the likelihood of harm or of benefit, respectively, and the classification of some items in each one of them could be argued. One example is the inclusion of contacting strangers online as a risk. To avoid normative approaches in these types of classifications, further qualitative and quantitative research in this area is needed.

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