Is agency correlated with greater ability of young adolescents to communicate about sexual and reproductive matters? Results from the Global Early Adolescent Study

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Short abstract

Investing in adolescent sexual and reproductive health (SRH) is increasingly recognized as a unique opportunity to realize a "triple dividend of benefits".[i] SRH communication in early adolescence is essential to build early adolescents' SRH knowledge skills before they engage in sexual activity. This study investigates the extent to which adolescents 10-14 years have ever communicated about sexual relationships, pregnancy and contraception and if greater agency in voice and decision making power increase SRH communication. Drawing from the Global Early Adolescent Study, we included 1,242 adolescents in Kinshasa, 1,214 in Shanghai; and 649 in Cuenca. We found that patterns of SRH communication varied substantially by site, with greater communication in Cuenca than Shanghai and Kinshasa. Adolescents with greater ability to voice their opinions were generally more likely to communicate about sexual relationships and contraception in Kinshasa and Cuenca while decision making power was inconsistently related to SRH communication in Shanghai.

Background

Investing in adolescent sexual and reproductive health is increasingly recognized as a unique opportunity to realize a "triple dividend of benefits", by addressing immediate health needs of a large and vulnerable population, and by promoting future health trajectories and "the welfare of the next generation"[1] While adolescent sexual and reproductive health programs have extensively focused on knowledge and service provision, growing emphasis is placed on girls' ability to make informed decisions based on their environment. In that respect, the concept of empowerment is increasingly viewed as a strategy to improve girls' sexual and reproductive outcomes globally.[ii]

Most current research focuses on women and girls of reproductive age, using measures of autonomy, voice, self-efficacy or decision making[iii,iv], while little work has focused on the transitional period of early adolescence. A key limiting factor in empowerment research among early adolescence is the lack of validated constructs of agency in this period of the life-course, when young people's autonomy expands but is still contingent on the power and resources of others in many aspects of their lives. The Global Early Adolescent Study (GEAS), a multi-country study exploring the ways gender norms shape young people's health and well-being across adolescence, developed a set of cross-cultural indicators of early adolescent agency, that measure voice and decision-making that were validated in 14 sites across 5 continents (ref). The GEAS measure of voice captures the extent to which young people can express their opinions and be heard, while decision-making relates to their ability to make choices autonomously in their daily lives. These measures of agency should be considered in conjunction with young people's environment, which at different levels of the ecological system, enable or constrain adolescents ability to act based on their own wishes.[v,vi]

Building on prior research demonstrating the importance of the social environment in improving adolescent sexual and reproductive health outcomes.(ref) we seek to investigate the interplay of agency and the social environment in promoting young people's sexual and reproductive autonomy. As most early adolescents have yet to experience sexual debut,[vii,viii,ix] we focus our attention on young people's communication patterns about sexual and reproductive health matters, as they seek information from others to build their SRH knowledge skills. This analysis builds on a body of literature linking adolescent-caregiver communication about SRH to positive SRH outcomes among older adolescents.[x,xi,xii] Specifically, we aim to investigate if agency in the form of voice and decision-making power relate to young people's SRH communication patterns, adjusting for their social environment, and if so, whether this process is consistent among boys and girls and across cultures.

Study setting and population

Our study population includes adolescents ages 10-14 living in resource-poor urban settings in Kinshasa, Democratic Republic of the Congo; Shanghai, China; and Cuenca, Ecuador. Adolescents included in the sample were surveyed as a part of the Global Early Adolescent Study baseline data collection between June 2017 and March 2018. Sample selection and size varied by site. Students in Cuenca were selected by stratified probability sampling by age and sex. In Kinshasa, adolescents were sampled from two groups: in-school and out of school adolescents due to high rates of school drop out

in this age group. For in-school adolescents, probability sampling was used to select 40 schools (stratified by commune and school type) and subsequently 25 students (approximately evenly distributed by sex and age) within each selected school. Out of school adolescents were selected from the same commune as in the school sample using a multi-stage sampling procedure. Neighborhoods were selected using simple random sampling. Within each selected commune, community-based organizations identified out of school adolescents between the ages of 10 and 14 to create a sampling list. Then, simple random sampling was used to select adolescents form the list. In Indonesia, eligible participants were enrolled in 7th grade in one of three schools in each city that had been selected by purposive sampling.

The GEAS surveys used a common research protocol, including training, consent and data collection procedures and survey instruments to ensure cross-site comparability. These procedures were pilot tested and refined across 14 GEAS sites prior to the current studies.[5] The GEAS research protocol was approved by the ethical committees of each site and approved or deemed exempt for secondary data analysis by the Johns Hopkins School of Public Health internal review board.

After obtaining parental consent and their own assent to participate, adolescents completed a 1.5-2 hour survey (including breaks to reduce fatigue) using tablets. Surveys were self administered by computer-assisted self-interview in Cuenca and Shanghai and interviewer administered in Kinshasa due to low literacy levels. In the case of face to face interviews in Kinshasa, adolescents who could read had the opportunity to complete some sections using CASI/ACASI for increased privacy.

The initial samples in each site included 1,383 adolescents in Kinshasa, 704 in Cuenca and 1,793 in Shanghai. After excluding individuals with missing information on outcome and main independent variables as detailed in analytical section, the samples comprised 1,242 adolescent in Kinshasa, 649 in Cuenca, and 1,214 in Shanghai.

Measures

The GEAS is a multi-thematic study exploring perceptions of gender norms, empowerment and their associations with a range of health and well-being behaviors and outcomes including sexual health, interpersonal violence, and mental health. The survey also assesses the ecological factors shaping young people's lives at the individual, family, peer and community levels.

Previous analysis based on GEAS pilot data collected among 120 adolescents across 14 GEAS sites identified cross-cultural measures of agency, pertaining to three domains relevant to early adolescents: freedom of movement, voice and decision making. Building on this prior work, we considered two specific cross cultural scales for our analysis (7 items for voice and 4 items for decision-making), outlined in **Table 1**. Ordinal Cronbach alphas for both voice and decision were satisfactory overall across the three sites (alpha between 0.69 and 0.88). In each site, each scale was constructed as a continuous variable ranging from 1 to 4, representing the mean score across subscale items. Higher score reflect adolescents' greater ability to voice their opinions and speak up with their parents, peers and with community members at large or their ability to make decision about daily life matters, such as clothing, food or time spent with friends. Continuous empowerment scales were subsequently dichotomized at the median for each site into "high" and "low" voice and decision-making, respectively.

Our outcomes of interest assess adolescents' history of ever communicating about several sexual and reproductive health topics: sexual relationships, pregnancy and how it occurs, or contraception. We constructed three binary measures based on these lifetime communication experiences.

We considered covariates in our analyses representing different levels of the ecological system of an enabling environment under which young people set and achieve their goals. Individual factors included age, sex, puberty onset, and educational attainment (grade for age). At the family level, we considered family structure (cohabitation with parents as well as number and gender composition of siblings), household wealth, parental migration history and parental monitoring and connectedness. At the peer level, we assessed network structure (number and sex of friends) and time spent with friends. At the neighborhood level, we considered young people's perception of social cohesion and safety.

Analysis

We first conducted exploratory analysis to evaluate patterns of missingness across all items comprising the agency subscales and dropped observations with 20% items missing or more for quality purposes, as agency questions were administered at the end of the survey, and may have suffered from respondent fatigue. Applying this criteria, 2% of cases were dropped in Cuenca, 3% in Kinshasa and 12% in Shanghai. For the remaining samples, we used K-Nearest Neighbor to impute sporadic missing responses to items comprising the subscales (kNN with k-value of 31, 25 and 34, respectively corresponding to the square root of complete cases in each of three sites: Kinshasa, Cuenca, and Shanghai).We conducted exploratory factor analysis to verify factor loadings and the internal reliability of each subscale in each site, and subsequently examined the distribution of each subscale per sex and site.

Next, we examined how the two domains of agency related to the ecological factors previously described, to assess the interplay between agency and adolescent's enabling environment. We also assessed the associations between the ecological environment (individual, family, peer and neighborhood) and adolescent's SRH communication patterns. We pursued the analysis by examining bivariate and multivariate associations between agency and communication, and for each site ran one model per agency indicator and per communication outcome. Multivariate analyses were conducted using logistic regression models, adjusting for the "enabling environment" at the individual, family, peer and neighborhood levels. All analysis were stratified by site to assess similarities and differences in adolescent empowerment processes by context. We also stratified all analysis by sexe to examine how empowerment processes varied by gender. Interactions between agency and sex were tested in multivariate models.

Results

The characteristics of the study population in each site are described in **Table 2**. A number of characteristics differed between sites: the sample was older in Shanghai than in the other two sites (mean age of 12.5 years verses 11.9 years), while a lower proportion of adolescents in Kinshasa were living with both parents. Adolescents in Shanghai were less likely to have siblings than in the other sites. Most parents in the three samples were born in the cities where their families currently resided, with parental migration history being least common in Cuenca (22% in Cuenca compared to nearly half in the other two sites).

Adolescent SRH communication patterns varied substantially by site **(Figure 1)**. Adolescents in Cuenca were the most likely to have talked to anyone about sexual relationships (44%), pregnancy (58%) or contraception (39%), followed by adolescents in Shanghai who had talked about these issues 29%, 34% and 27% of the time, respectively. Adolescents in Kinshasa were the least likely to have talked about any of these topics (9% had talked about sexual relationships, 10% had talked about pregnancy and 9% had talked about contraception). Boys were more likely to have discussed sexual relationships than girls in Kinshasa and Shanghai, but neither difference was significant. The reverse was true in Cuenca (48% of girls and 40% of boys, p=0.04). Communication around pregnancy was more common among girls than boys in Kinshasa (13% of girls and 8% of boys, p=0.004) and Cuenca (63% of girls and 5% of boys, p=0.006) while no sex differences were noted in Shanghai. Communication about contraception was comparable for boys and girls in Cuenca and Shanghai but more common among girls than boys in Kinshasa (11% vs. 7%, p=0.029) (**Table 3)**.

Levels of agency also differed by sex and site. Mean scores for voice and decision making (on a scale from 1 to 4), were lowest in Kinshasa (2.46 for voice and 2.69 for decision making), intermediate in Shanghai (3.13 and 3.43) and highest in Cuenca (3.34 and 3.42). Scores for voice were higher for boys than girls in Kinshasa (2.53 versus 2.39, p<0.001) while no sex differences in voice mean scores were apparent in other sites. Scores for decision making were higher for girls than boys in Shanghai (3.49 versus 3.37, p=0.002), while no sex differences were observed in Kinshasa and Cuenca (T**able 3**). Distributions for high vs. low (at or above vs. below the median) agency mean scores by sex are displayed in **Figure 1 and Figure 2**, respectively.

After adjustment for participant characteristics at the individual, family, peer and neighborhood levels,more voice was related to higher probabilities of communication about SRH topics in both the Kinshasa and Cuenca samples **(Figure 3)**. In Kinshasa, adolescents with more voice were more likely to communicate about all three SRH topics (aOR: 2.24, p<0.001 for communication about sexual relationships, aOR: 2.12, p<0.001 for communication about pregnancy, and aOR: 1.75, p=0.01 for communication about contraception). In Cuenca, associations between voice and SRH communication were also found for all three SRH communication topics (aOR: 1.72, p=0.002 for sexual relationships, aOR: 1.56, p=0.013 for pregnancy and aOR: 1.89 p=0.001 for contraception). No associations between voice and any form of SRH communication

were observed in Shanghai. The strength of the observed associations differed between boys and girls in Kinshasa. While girls with high voice were more likely to have discussed pregnancy (aOR: 3.69, p<0.001) than girls with low voice, thet association was weaker for boys (aOR: 1.27, p=0.443) (test of interaction, p=0.040).

Associations between decision scores and communication about SRH were less consistent than those for voice (**Figure 3)**. In Kinshasa, no adjusted associations were detected between high decision agency and communication about either sexual relationships, pregnancy or contraception. Similarly, no relationship between decision and SRH communication was found after adjustment in overall models for the Cuenca sample. In Shanghai, a positive association between talking about high decision scores and ever having discussed sexual relationships was detected (aOR: 1.42, p=0.009), but not for the other two SRH topics. No differences by sex were detected in any of the models assessing the adjusted relationships between decision-making and SRH communication.

Considerations of factors associated with adolescent agency must also take into account the enabling environment. When we assessed socio-ecological influences on adolescents' odds of SRH communication we found that older age was associated with communication across SRH topics and settings. Parental migration history was influential on SRH communication in Cuenca, where adolescents whose parents were born in Cuenca were more likely to have discussed sexual relationships (aOR: 1.87, p=0.004 for the voice model, aOR: 1.83, p=0.005 for the decision-making model), pregnancy (aOR 1.64, p=0.017 for voice, aOR: 1.60, p=0.022 for decision-making) and contraception (aOR: 1.73, p=0.015 for voice and aOR: 1.69, p=0.020 for decision-making). Grade-for-age education status in Kinshasa was associated with higher odds of having discussed contraception (aOR: 2.29, p=0.001 for voice, aOR: 2.38, p<0.001 for decision). More adolescents in Cuenca who were only children had discussed sexual relationships than those with mixed-sex siblings (aOR: 2.04, p=0.045 for voice and aOR: 2.04 p=0.044 for decision-making).

Discussion

This analysis provides novel data on the interrelation of agency and adolescents' enabling environments in fostering SRH communication around pregnancy, contraception and sexual relations in early adolescence, before most adolescents engage in sexual activity.

Our results demonstrate wide variation in levels of SRH communication across diverse cultural settings with greater communication in Cuenca (39-58%) than Shanghai (27-34%) and Kinshasa (9-10%). Relatively low levels communication in Kinshasa and Shanghai follow prior literature that outlines low level of adolescent-caregiver communication in other Sub-Saharan African[xiii] settings and in China[xiv]. Though our study found that Kinshasa had the lowest level of adolescent SRH communication, the DRC's adolescent fertility rate is high[xv] and 15-24 mCPR rate low[xvi], highlighting a need for improved SRH outcomes that increased SRH communication beginning in early adolescence could contribute towards.

In Kinshasa and Shanghai, sex patterns of SRH communication emerged with girls more likely to discuss pregnancy than boys and both sites, and more likely to discuss sexual relations in Cuenca. These sex differences, observed in prior studies,[xvii,13,xviii] are likely to reflect the social and reproductive health consequences of sexual activity that are perceived to fall on disproportionately girls,[xix] which may prompt parents or other adults to engage in SRH related communication with girls to a greater extent than boys.'[xx]

SRH communication was both related to adolescent agency and their enabling social environment. Specifically, adolescents with more voice were typically more likely to have communicated about SRH topics than those who felt less heard or able to share their opinions. This was especially true for girls in Kinshasa, who generally had lower voice agency than boys.but who were more likely than boys to engage in SRH discussions when they felt they could be heard (higher voice agency) These results bridge to the growing literature stressing the importance of women's empowerment in improving their health and well being (ref), specifically as it relates to sexual and reproductive health (ref). We add to this body of work by stressing the importance of promoting young adolescent's agency in building their knowledge skills through SRH communication, to improve their ability to engage in volitional safe sexual relations as they transition to adulthood. Indeed, existing research has tied communication about SRH topics to positive reproductive health outcomes.[6,7,xxi]

In addition to agency, the study also shows patterns across settings social of SRH communication, drawing attention to the importance of an enabling environment to foster SRH communication and build young people's competencies prior to their

engagement in sexual activity. Older age was linked to communication about SRH topics across sites, which mirrors existing literature 17, and follows greater relevancy of SRH topics as adolescents age into sexual activity and have greater opportunity to be exposed to such conversation. Adolescents whose parents were born in Cuenca had higher odds of ever discussing all three SRH topics, suggesting a migration effect on familial norms regarding SRH topics that may shape discussions about SRH topics that take place at home. In Kinshasa, adolescent at or above expected grade for their age had higher likelihood of having discussed contraception, perhaps indicating greater opportunity for exposure to sexuality education in schools and conversation with friends and classmates compared to their same-age peers who are behind in school. These varied findings across site reflect heterogeneous environments shaping adolescents experiences of communicating about SRH.

This study had a number of limitations, discussed below. We were not able to stratify analyses by the person with whom the adolescent had communicated, nor were we able to assess who initiated the conversations about SRH. Disaggregating the conversations adolescents initiated from those that someone initiated with the adolescent would provide a more in-depth understanding of the role of agency in SRH communication. Furthermore, cross sectional associations cannot be interpreted as causation. A longitudinal perspective on the association between agency and SRH communication is needed to better assess the directionality of associations and their contribution to healthy sexual and reproductive behaviors as adolescents become sexually active. Such an approach will be pursued in the next phase of the Global Early Adolescent Study using subsequent waves of data. Additional understanding of the role of agency on SRH communication and SRH behaviors may also be captured through empowerment interventions, such as the Growing Up Great project that is linked to the Global early Adolescent Study in Kinshasa within the Passage consortium (ref). The GEAS focuses on urban poor populations and therefore, our results are not generalizable to adolescents living in other urban or rural contexts in the countries included in the study, not to adolescents living in other geographies. The cross cultural comparison provides evidence on the importance of context in shaping adolescents' experiences, and should therefore be considered when designing interventions to improve ASRH. .

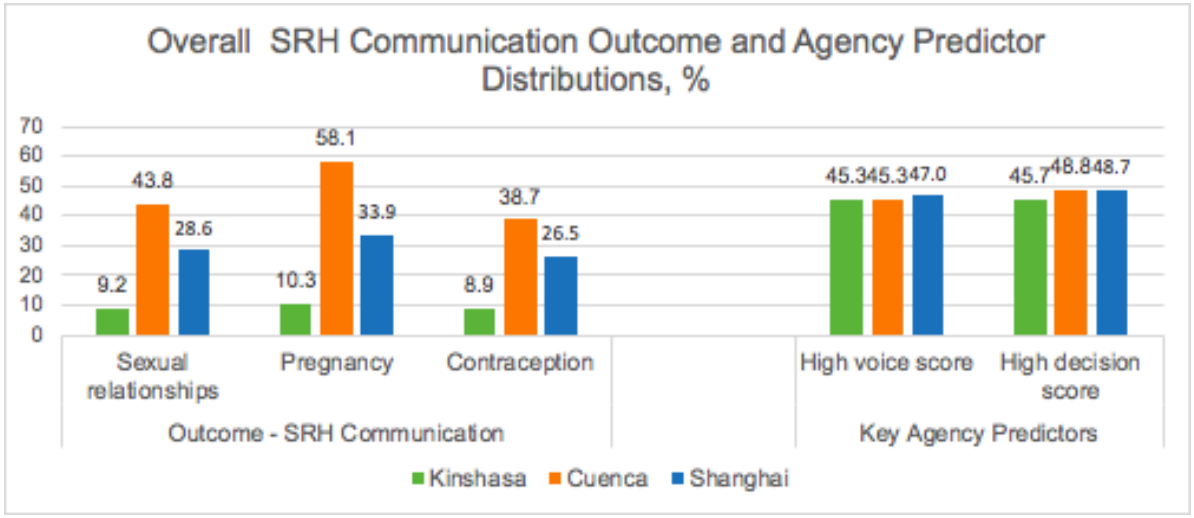
Taken together, our findings suggest that interventions to promote autonomy in voice in the early adolescent period may be effective in promoting SRH communication, and in turn positive reproductive health outcomes in later adolescence. The heterogeneity in our findings also underscore the importance of tailoring interventions to local contexts. As SRH communication is not necessarily imparting accurate or positive information about SRH topics, interventions to impart accurate SRH information not only directly to adolescents, but also to teachers, parents, and health workers are an important step to building towards positive SRH outcomes among adolescents.

Table 1. Agency Measures

		Ordinal Cronbach Alphas		
Questions	**Response Options**	**Kinshasa**	**Cuenca**	**Shanghai**
Voice Score: How often are the following statements true for you?				
My parents or guardians ask for my opinion on things My parents or guardians listen when I share my opinion My friends ask my advice when they have a problem If I see something wrong in school or the neighborhood I feel I can tell someone and they will listen I can speak up in class when I have a comment or question I can speak up when I see someone else being hurt I can ask adults for help when I need it	Often Sometimes Rarely Never	0.78	0.81	0.88
Decision Score : How often are you able to make the following decisions on your own, without an adult?				
What clothes to wear when you are not in school/working What to do in your free time What to eat when you are not at home Who you can have as friends	Often Sometimes Rarely Never	0.75	0.69	0.84

Table 2: Sample Descriptions			Kinshasa % n=1,242	Shanghai % n=1,214	Cuenca % n=649
	Age	(mean + SD)	12.00 ± 1.40	12.50 ± 0.96	11.92 ± 1.35
		Boy	50.4	49.2	50.7
	Gender	Girl	49.6	50.8	49.3
Individual	Age expected grade or higher		60.5	96.5	96.8
		Living with no parents	14.8	4.3	3.5
		Living with one parent only	27.7	12.0	29.9
	Family composition	Living with both parents	57.5	83.7	66.6
		No siblings	2.1	66.4	6.8
		Same sex sibling only	9.5	7.6	23.9
	Sibling	Sibling of opposite sex	88.4	26.0	69.3
	Caregiver closeness	Yes	63.29	57.6	77.0
	Caregiver monitoring	Yes	41.8	83.4	76.0
Family	% parent migration		42.4	42.3	21.9
		No friends	4.0	4.7	2.6
		Same sex friends only	55.0	38.1	23.0
	Friend sex composition	Any opposite sex friends	41.0	57.3	74.4
		None	4.4	4.7	2.6
		1-2 friends	30.3	18.1	13.7
	Number of friends	>2 friends	65.3	77.2	83.7
	Time spent	No friends or no time spent with friends	5.9	40.0	39.3
		Every other day or less	42.3	53.5	44.1
Friend/Peer		Nearly every day	51.3	6.5	16.6
	High neighborhood cohesion		25.6	56.3	40.7
Neighborhood	Perceived neighborhood safety		20.0	2.9	17.6

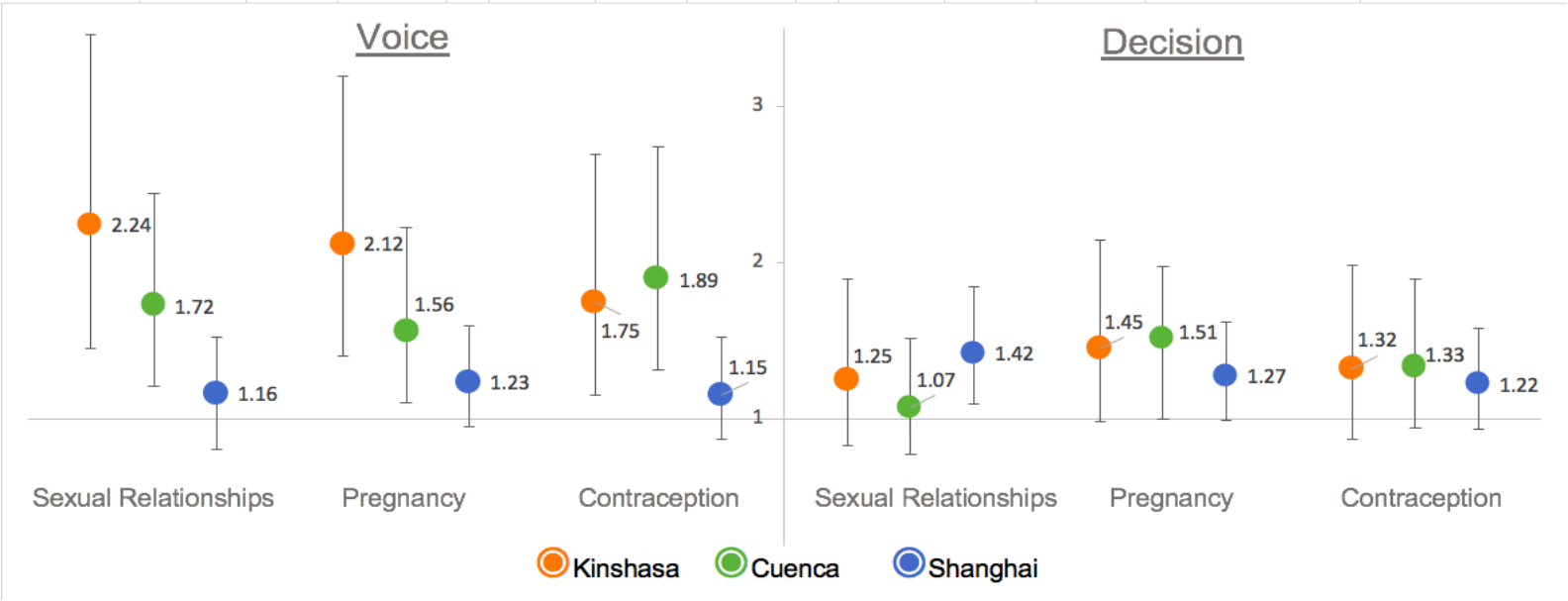
Figure 1.Overall SRH Communication Outcome and Key Agency Predictor Distributions, %



		Kinshasa				Cuenca				Shanghai			
		Overall	Boys	Girls	p	Overall	Boys	Girls	p	Overall	Boys	Girls	p
		%											
Ever Talked About	Sexual relationships	9.2	10.2	8.1		43.8	**39.8**	**47.8**	*	28.6	40.0	26.3	
	Pregnancy	10.3	**7.8**	**12.8**	**	58.1	**52.9**	**63.4**	**	33.9	32.7	35.0	
	Contraception	8.9	**7.2**	**10.7**	*	38.7	37.1	40.3		26.5	27	26.1	
		Mean ± SD											
Agency Mean Scores	Voice (1-4)	2.46 ± 0.61	**2.53 ± 0.66**	**2.39 ± 0.82**	***	3.34 ± 0.51	3.32 ± 0.50	3.36 ± 0.52		3.13 ± 0.64	3.12 ± 0.65	3.14 ± 0.62	
	Decision (1-4)	2.69 ± 0.65	2.71 ± 0.63	2.66 ± 0.89		3.42 ± 0.62	3.41 ± 0.65	3.44 ± 0.58		3.43 ± 0.65	**3.37 ± 0.68**	**3.49 ± 0.61**	**

* - ≤ 0.05. **≤0.01. ***≤0.001

Figure 3: Adjusted Odd Ratios for Ever Having Discussed SRH Topics for High vs. Low Voice and Decision Scores



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