



Measuring social norms and attitudes about age-disparate transactional sex: Psychometric testing of the NAATSS

Nancy A Perrin,^{a,*} Ruti G Levtov,^b Caroline Ferraz Ignacio,^c Luis Anunciação,^d Jesus Landeira-Fernandez,^d Linda Cerdeira,^e Giovanna Lauro,^c Beniamino Cislighi,^f and Ana Maria Buller^f

^aJohns Hopkins University School of Nursing, Baltimore, MD, USA

^bPrevention Collaborative, Washington, D.C., USA

^cPromundo-US, Washington, D.C., USA

^dPontificia Universidade Católica do Rio de Janeiro, Rio de Janeiro, RJ, Brazil

^eCenter for the Social Studies of the University of Coimbra, Coimbra, Portugal

^fLondon School of Hygiene and Tropical Medicine, London, UK

Summary

Background Transactional sex between girls under 18 years-old and adult men at least ten years older, known as age-disparate transactional sex (ADTS), is an established risk factor for HIV, STI and early pregnancy among girls and women. Social norms or beliefs about what others expect from you and what others do can sustain behaviours such as ADTS even when individuals may be personally against them. In order to evaluate interventions to change social norms, validated instruments for measuring change in personal beliefs and social norms regarding ADTS are needed.

Methods Items for the *Norms and Attitudes on Age-Disparate Transactional Sex Scale* (NAATSS) were generated based on qualitative interviews and expert panel review. The reliability and validity of the NAATSS was tested in a representative sample ($N = 431$) from Brazilian favelas. Factor analysis assessed construct validity, Cronbach's alpha assessed reliability, and t-tests and analysis of variances tested hypothesized differences between gender, age, and previous experience with ADTS in both the social norms and personal beliefs domains.

Findings Factor analysis revealed three factors in each domain. The factors were labelled "Attributions to Girls' Behaviour" which has 5 items, "Men's Motivations" with 5 items, and "Girls' Readiness to have Sex" with 3 items. The subscales evidenced acceptable reliability with Cronbach's alphas ranging from 0.72 to 0.83 for the social norms subscales and 0.59 to 0.82 for the personal beliefs subscales.

Interpretation The items were developed based on qualitative research and expert rankings and the resulting *Norms and Attitudes on ADTS Scale* exhibits strong psychometric properties. Each of the three subscales within the two domains illustrate good factor structure, acceptable internal consistency reliability, and are supported by the significance of the hypothesized group differences.

Funding This work was supported by the OAK Foundation [grant number OCAY-16-188].

Copyright © 2022 Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

Introduction

Age-disparate transactional sex (ADTS), or transactional sex between girls under 18 years-old and adult men at least ten years older, is an established risk factor for HIV, STI, early pregnancy and child marriage as a result of power imbalances in these relationships.¹⁻³ This association has led to increased interest in the topic from a public health perspective, however the

distribution of available evidence is uneven geographically with most studies conducted in in Sub-Saharan Africa (SSA) and Western Europe.⁴ The limited evidence arising from the Americas stems from the US with few studies found in Latin America, Asia and Oceania. Emerging evidence from the US show that similarly to SSA, transactional sex has been associated with low socio-economic status and increased risk of STI through reduced ability to negotiate condom use due to age power imbalances.⁵ In Brazil, research has not focused on ADTS despite the fact that Brazil is fourth in

*Corresponding author.

E-mail address: perrinna@jhu.edu (N.A. Perrin).

The Lancet Regional Health - Americas

2022;10: 100209

Published online xxx

<https://doi.org/10.1016/j.lana.2022.100209>

1

Research in context

Evidence before this study

Age-disparate transactional sex (ADTS) or transactional sex between girls less than 18 years-old and adult men at least ten years older is a risk factor for HIV, STI, and early pregnancy for women and girls. Social norms may sustain ADTS even when people's individual beliefs do not support the practice. Therefore, interventions that target harmful social norms may help to align personal beliefs and social norms and prevent unwanted ADTS. Progress has been made in defining and measuring the concept of transactional sex, however no scales on social norms around ADTS are available, which limits researchers' ability to assess the effectiveness of norms-shifting prevention efforts around this issue.

Added value of this study

This study developed and tested the psychometric properties of the *Norms and Attitudes on Age-Disparate Transactional Sex Scale* (NAATSS). The measure is, to our knowledge, the first one to capture personal attitudes and social norms regarding girls' ADTS relationships with adult men. The scale builds on qualitative work in Brazilian favelas to create a reliable and valid measure that captures three dimensions of ATS - Attributions to Girls' Behaviour, Men's Motivations, and Girls' Readiness to have Sex - in each of the social norms and personal beliefs domains.

Implications of all the available evidence

The NAATSS illustrates good reliability and validity and captures differences between genders, age groups, and experiences of ATS on each of its subscales in the two domains. Using a common set of items to measure social norms and personal beliefs will allow researchers to compare changes in these constructs after an intervention and facilitates comparison of intervention impact on personal beliefs with impact on social norms.

the world for girls being married or co-habiting with men before the age of 15 and that child marriage in Brazil often begins with transactional sex.^{6,7} Despite Brazil's legal reforms to reduce sexual violence against children and adolescents, the problem persists with 36% of girls being married before 18 years in 2015.⁸

Some of the latest work globally in ADTS aims to bolster primary prevention efforts by building on the growing research to understand the social norms that prevent or promote ADTS practices in communities.^{9–15} Social norms are operationalised as one's beliefs about what others expect from them (injunctive norms) and what others do (descriptive norms). Because of social norms, people can comply with practices they personally dislike.¹⁶ Interventions focused on personal beliefs or attitudes may be insufficient for changing practices in communities, rather interventions may need to focus on

changing social norms. In order to evaluate these interventions, validated instruments for measuring change in personal beliefs and social norms regarding ADTS are needed. The field of social norms change measurement is still nascent, however some validated measures exist in particular around gender-based violence in humanitarian settings.^{17,18} Progress has been made in defining and measuring the concept of transactional sex, however no measures on social norms around ADTS are available, which limits our ability to assess the effectiveness of norms-shifting prevention efforts around this issue.¹⁹

In this paper, we describe the development and psychometric properties of the *Norms and Attitudes on Age-Disparate Transactional Sex Scale* (NAATSS) which builds on previous qualitative research highlighting the normalization of sexual relationships between underage girls and adult men in Rio de Janeiro.^{14,20} The measure is, to our knowledge, the first to capture beliefs and norms about girls' transactional sexual relationships with adult men.¹⁷ The social norms domain, one's beliefs about what others approve or disapprove of, and the personal beliefs domain are measured separately. Our goal was to create a measure using a common set of reliable and valid items for social norms and personal beliefs to facilitate comparisons between these two domains.

Methods

Item generation

Item generation was based on the findings from our previous qualitative study which identified underlying themes relevant to personal beliefs and social norms about transactional sex in Brazil.¹⁴ These included placing blame on girls, benefits for girls of relationships with older men, outside influences on girls, and men's behaviours and desires. The research team generated multiple items within each theme based on the qualitative transcripts for a total of 67 items. For several items, multiple versions of the same question were included in order to identify the phrasing that is the most relevant and clear, therefore, we expected that the set of items would be greatly reduced after the expert review. Experts in ADTS from academics and non-governmental organizations ($n = 14$) were asked to indicate 1) the extent to which they perceived that each item adequately represents a social norm that might promote or prevent transactional sex using a 5-point rating scale (1= not adequate to 5= strongly adequate); 2) the clarity of each item (1=not clear to 5=totally clear) and 3) the importance in relation to ADTS (1= not important to 5= extremely important).²¹ Seven experts returned their evaluations in the stipulated time and Content Validity Coefficients (CVC) were computed for each item by dividing the average rating across experts by the maximum possible score of 5 with the result ranging from 0 to 1.²⁰ A CVC

score of .90 or higher was considered acceptable, meaning there is high agreement among the raters that the item is relevant and clear. For items with multiple versions, the item with the highest expert ratings were retained, reducing the set to 41 items. These items were then pre-tested for acceptability, clarity, relevance, and comprehension with 17 participants from the target communities. Based on participants' feedback, 10 additional items were removed, four of which were redundant items that we felt input from the target community was needed before deciding on the final item. The 31 remaining items were included in the psychometric testing.

Psychometric testing

Study site. Study communities were selected according to their geographical location (including safety of the area and accessibility) and an adapted Social Vulnerability Index (aSVI), which is based on urban infrastructure, human capital, income and labour indicators.²² The study areas were communities of social, political and economic vulnerability in Rio de Janeiro, Brazil, that experience high ADTS activity and high aSVIs: the Nova Holanda in the Complexo da Maré and the Babilônia/Chapéu Mangueira area.

Sample. The sample size was determined using a probabilistic method to estimate the margin of error for multistage sampling that ensures that the sample accurately reflects the population from which it was drawn. We estimated the margin of error for various sample sizes and selected the sample size needed to achieve a margin of error less than 5%. The margin of error is 4.8% for $N = 430$. When determining sample size for factor analysis, the recommended ratio of number of subjects to number of items varies from 2:1 to 20:1.²³ Our target sample size of 430 participants for psychometric testing has a 13.8:1 ratio which is within the range of other published studies.²⁴ In total the sample had 431 participants selected using a multi-stage sampling plan (census sectors, households, resident) with eight census tracts randomly sampled from each community. Households in each sector were numbered and a starting household randomly selected. Quotas for each sector were stratified by sex (50% male and 50% female) and age of residents (with a 1/3 of the sample in each of 15–17, 18–24, and 25+ age groups). After household selection, the interviewer selected a resident that met the quota guidelines in terms of age and gender. Data were collected on tablets by gender-matched trained interviewers.

Measures. The NAATSS includes 31 unique items which are asked twice, once with respect to personal beliefs

domain and second with respect to social norms domain (total of 62 items). The social norms items started with “In the opinion of the residents of your community. . .” with the response scale of 5 – strongly disagree, 4– disagree, 3– neither agree nor disagree, 2–agree, and 1 –strongly agree. The personal beliefs items started with “In your opinion. . .” and used the same response scale. The scale was developed and administered in Portuguese. Scores for each of the factors (subscales) were computed by taking the sum of the items within each subscale. In addition, we collected basic demographics of age, gender, education, religion, household income, and previous experiences with transactional sex.

Psychometric analyses

For each of the two sets of 31 items (personal beliefs and social norms), we examined construct validity with factor analysis using the common factor model with oblique rotation (direct oblimin) which allows the factors to be correlated.²⁵ Rotation improves interpretability by aligning each item with one of the factors. Factor loadings of 0.30 or above were considered as loading on a given factor.²⁴ Items that did not load on any factor were reviewed for elimination from the scale. Reliability was estimated with Cronbach's alpha, a measure of internal consistency, for each of the subscales in each of the two domain. Values of 0.65 or greater were considered acceptable.²⁶

Pearson r correlations examined the association between the corresponding subscales in the personal beliefs and social norms domains (e.g., “Men's Motivations” Personal Beliefs subscale with “Men's Motivation” Social Norms subscale). Known groups validity, a form of convergent validity, tested three a priori hypotheses: H_1 : Men and women will differ on social norms and personal beliefs related to ADTS; H_2 : Those with transactional sex experience will differ from those without on social norms and personal beliefs related to ADTS; and H_3 : There will be age differences on social norms and personal beliefs related to ADTS. T-tests tested the first two hypotheses and analysis of variance the third hypothesis.

Ethics approval and consent to participate

Ethical approval was obtained from the Committee for Ethics in Research of the Philosophy and Humanities Center of the Federal University of Rio de Janeiro (CAAE 65254917.0.0000.5582) and from the London School of Hygiene & Tropical Medicine (Ethics Reference no. 11958).

Role of the funding source

The funder of this study did not have any role in study design, data collection, data analysis, interpretation, writing of the report or decision to submit.

Results

Sample description

Table 1 describes the characteristics of the 431 participants. The sampling frame achieved a fairly equal distribution for gender (53.1% female and 46.9% male) and age groups (32.3% 15–17 year olds; 31.6% 18 to 24 year olds; 36.2% 25 or older). More than a third of respondents identified their religion as Protestant/Pentecostal (36.9%), followed by no religion (32.5%) and Catholic (27.6%). Over one-third of the sample (38.8%) had not completed primary school, 16.2% completed primary school, 23.4% had not completed secondary school, 16.9% completed secondary school and 4.6% had some or completed higher education. Less than half (38.7%) were employed and most households (67.16%) reported their income as less than two times the minimum wage (R\$954 Brazilian Reais or USD \$228.96 in 2018). Approximately 15% had participated in sexual relations in exchange for a gift or material items.

Factor analysis

Communalities from the factor analysis were examined for each of the 31 items and items with communalities less than 0.30 were dropped as very little of the variance

in the item was explained by the factors. In the personal belief domain, 17 items had communalities greater than 0.30 and in the social norms domain, 24 items had communalities greater than 0.30. Since our goal was finding a common factor solution for both social norms and personal beliefs, the factor analyses were re-estimated using the 15 items in common to both the social norms and personal beliefs domains, which were also the items with the strongest communalities in both domains.

Personal beliefs. Factor analysis of the 15 items in the personal belief domain suggested three or four factors (first five eigenvalues were 3.85, 1.99, 1.44, 1.05, 0.85). Examination of three and four factor solutions, suggested two items “men involved with girls are manipulating them” and “when a girl and a man have sexual relations, the man benefits more” did not load on any of the factors and so were dropped. Factor analysis of the remaining 13 items again suggested three factors (first five eigenvalues were 3.77, 1.86, 1.33, 0.88, 0.78). Each item loading was above 0.35 on only one factor and the solution explained 40.2% of the variance. Table 2 presents the factor loadings for the three factors. The following titles were given to represent the three factors: “Attributions to Girls’ Behaviour” which has five items, “Men’s Motivations” which has five items, and “Girls’ Readiness to have Sex” with three items.

Social norms. A similar factor structure to the personal beliefs domain was found for the social norms domain. The initial 15 items suggested a three factor solution (first five eigenvalues were 5.03, 1.62, 1.54, 0.97, 0.74) with good simple structure and explaining 43.95% of the variance. Five items loaded on the “Attributions to Girls’ Behaviour” factor, seven on the “Men’s Motivations” factor, and three items on the “Girls’ Readiness to have Sex” factor. The two items dropped in the personal beliefs factor analysis had the lowest loading on the “Men’s Motivations” factor for social norms and were dropped. The 13-item factor analysis suggested a three factor solution (first five eigenvalues were 4.56, 1.61, 1.43, 0.84, 0.71) and had good simple structure with each item loading above 0.47 on only one factor and explaining 46.6% of the variance (Table 3).

Reliability

Cronbach alpha reliabilities (see Tables 2 and 3) were good for all subscales within the social norms domain ranging from 0.72 to 0.83. In the personal belief domain Cronbach’s alpha ranged from 0.59 to 0.82, with the lowest for the three item Girls’ Readiness factor.

	N (%)
Female	229 (53.1%)
Age	
15–17 year old	139 (32.3%)
19–24 year old	136 (31.6%)
25–70 year old	156 (36.2%)
Religion	
Protestant/Pentecostal	159 (36.9%)
Catholic	119 (27.6%)
Other	13 (3.0%)
No religion	140 (32.5%)
Education	
Did not complete primary school	167 (38.8%)
Completed primary school	70 (16.2%)
Did not complete secondary school	101 (23.4%)
Completed secondary school	73 (16.9%)
Some or completed higher education	20 (4.6%)
Employed	167 (38.7%)
Student	155 (36.0%)
Income	
One minimum salary	149 (34.6%)
Between one and two minimum salaries	140 (32.5%)
Between two and three minimum salaries	66 (15.3%)
More than three minimum salaries	27 (5.6%)
Did not respond	49 (11.4%)
Has participated in sexual relations in exchange for gifts or material items	44 (15.1%)

Table 1: Demographic characteristics of sample (N = 431).

You think that . . .	Attributions to Girls' Behaviour	Men's Motivations	Girls' Readiness to have Sex
If a girl responds positively to the advances of a man on the street, she should have sex with him	0.733	-0.113	0.028
Girls that accept presents or protection from men should repay with sex	0.723	-0.003	0.086
Girls that use short skirts are looking for male attention	0.703	0.055	-0.006
Girls that spend a lot of time in the street are available to get involved with men	0.674	0.001	-0.055
Girls that get involved with men gain financial stability	0.541	0.136	0.015
Men feel more powerful in sexual relations with girls than with women	-0.066	0.659	-0.037
Men get more pleasure from sex with girls than with women	0.000	0.619	0.093
Men think that the body of a girl is more attractive than that of a women	-0.020	0.590	-0.028
Men like to get involved with girls because they are easier to control than women	0.087	0.571	-0.093
Men never refuse sex offered by a girl	0.061	0.346	0.107
A girl with a developed body has the maturity to make decisions about her sexual partners and relations	-0.091	0.015	0.688
A girl with a developed body is ready to have sex	0.124	0.100	0.671
Girls of 13 to 14 years old are able to choose their sexual partners and relationships	0.045	-0.043	0.362
Cronbach's Alpha	0.82	0.70	0.59

Table 2: Factor loadings and cronbach alphas for the personal beliefs domain of NAATSS.

Descriptive statistics for subscales

The social norms and personal belief subscale for Men's Motivations and Attributions to Girls' Behaviour scores range from 5 to 25 with higher scores reflecting social norms and attitudes more supportive of ADTS (Table 4). Social norms and personal belief subscale for Girls' Readiness to have Sex ranged for 3 to 15. The observed distributions covered the full possible range for all subscales. No ceiling effects are apparent with the means falling in the mid-range of the subscales. Values for skewness and were between -0.5 and +0.5 for four of the six subscales indicating an approximately symmetric distribution with 2 between 0.5 and 1, indicating

moderate skew. Cross-domain correlations (personal beliefs with social norms) were $r = 0.29$ ($p < .001$) for Men's Motivation, $r = 0.48$ ($p < .001$) for Attributions to Girls' Behaviour and $r = 0.21$ ($p < .001$) for Girls' Readiness to have Sex, illustrating that people's social norms and personal beliefs are different and not highly aligned.

Known groups validity

Women are significantly less likely than men to think girls are looking to be involved in ADTS (Women $M = 11.61$, $SD=3.57$; Men $M = 14.93$, $SD=4.63$; $p < .001$;

How many people in your community think that . . .	Attributions to Girls' Behaviour	Men's Motivations	Girls' Readiness to have Sex
If a girl responds positively to the advances of a man on the street, she should have sex with him	0.548	0.070	0.055
Girls that accept presents or protection from men should repay with sex	0.646	0.060	0.032
Girls that use short skirts are looking for male attention	0.791	-0.019	-0.052
Girls that get involved with men gain financial stability	0.651	0.037	0.019
Girls that spend a lot of time in the street are available to get involved with men	0.767	-0.081	-0.008
Men feel more powerful in sexual relations with girls than with women	-0.031	0.733	0.011
Men get more pleasure from sex with girls than with women	0.049	0.637	-0.028
Men think that the body of a girl is more attractive than that of a women	-0.001	0.682	0.027
Men like to get involved with girls because they are easier to control than women	0.070	0.705	-0.032
Men never refuse sex offered by a girl	-0.031	0.520	0.016
A girl with a developed body has the maturity to make decisions about her sexual partners and relations	-0.006	-0.071	0.774
A girl with a developed body is ready to have sex	-0.025	0.011	0.768
Girls of 13 to 14 years old are able to choose their sexual partners and relationships	0.044	0.059	0.469
Cronbach Alpha	0.83	0.80	0.72

Table 3: Factor loadings and cronbach alphas for the social norms domain of the NAATSS.

	Min	Max	Mean	Std. Dev.	Skewness	Kurtosis
Personal Beliefs						
Attributions to Girls' Behaviour	5.00	25.00	13.26	4.46	0.600	0.055
Men's Motivations	8.00	25.00	17.04	3.55	-0.188	-0.420
Girls' Readiness to have Sex	3.00	14.00	7.25	2.31	0.305	-0.208
Social Norm						
Attributions to Girls' Behaviour	5.00	25.00	15.37	4.89	-0.045	-0.689
Men's Motivations	5.00	25.00	16.97	4.14	-0.573	0.115
Girls' Readiness to have Sex	3.00	15.00	8.11	2.99	0.048	-0.878

Table 4: Descriptive statistics for subscales within each domain.

ES=0.76) and are ready to have sex (Women $M = 6.70$, $SD=2.34$; Men $M = 7.70$, $SD=2.20$; $p < .001$; $ES=0.39$). Women are significantly less likely than men to perceive the community as supporting girls' role in ADTS (Women $M = 14.72$, $SD=4.80$; Men $M = 15.82$, $SD=5.02$; $p = .015$; $ES=0.24$), and were significantly more likely to perceive that the community believes girls are ready to have sex (Women $M = 8.47$, $SD=3.03$; Men $M = 7.71$, $SD=2.86$; $p = .008$; $ES=0.26$). There were no significant differences between men and women on personal beliefs or social norms around men's motivations in transactional sex (see Figure 1).

Those with prior transactional sex experience see men as actively benefitting more from transactional sex (prior $M = 19.35$, $SD=2.95$; no prior $M = 16.66$, $SD=3.50$; $p < .001$; $ES=0.75$), see girls as actively involved in transactional sex (prior $M = 16.82$, $SD=5.64$; no prior $M = 12.53$, $SD=3.82$; $p < .001$; $ES=0.89$), and

see girls as more ready to have sex (prior $M = 7.92$, $SD=2.35$; no prior $M = 7.02$, $SD=2.29$; $p = .003$; $ES=0.39$) than those with no prior transactional sex experience. Participants that have engaged in transactional sex are significantly more likely than those who have not to perceive that the community see men as actively benefitting from transitional sex (prior $M = 18.83$, $SD=3.73$; no prior $M = 16.47$, $SD=4.25$; $p < .001$; $ES=0.56$), see girls actively involved in transactional sex (prior $M = 18.17$, $SD=5.22$; no prior $M = 14.59$, $SD=4.7$; $p < .001$; $ES=0.71$) but that girls are not ready to have sex (prior $M = 7.35$, $SD=3.08$; no prior $M = 8.17$, $SD=2.94$; $p = .035$; $ES=0.27$).

Younger persons were more likely to agree that men benefit from being actively involved in ADTS and more likely to agree that girls are ready to have sex. Younger persons also perceive that the community agrees that men are actively involved in ADTS, girls are actively

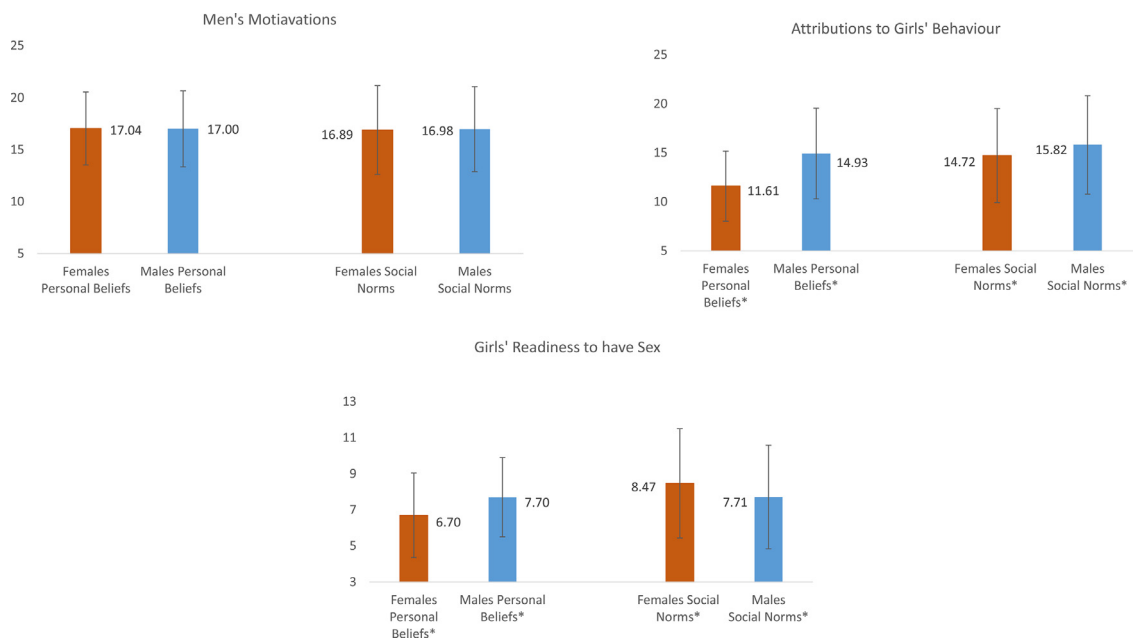


Figure 1. Mean and standard deviations error bars comparing males and females on the NAATSS subscales. Categories with an asterisk (*) signify that males and females are significantly different on that subscale.

	15–17 years old N = 139	18–24 years old N = 136	25–70 years old N = 155	p-value
Personal Beliefs				
Attributions to Girls' Behaviour	13.63 (4.98)	12.51 (4.07)	13.38 (4.16)	.120
Men's Motivations	18.20 (3.19)	16.74 (3.64)	16.21 (3.60)	<.001
Girls' Readiness to have Sex	7.69 (2.39)	7.26 (2.28)	6.65 (2.20)	<.001
Social Norm				
Attributions to Girls' Behaviour	16.04 (4.79)	15.10 (4.68)	14.63 (5.20)	.032
Men's Motivations	17.70 (3.73)	16.96 (3.96)	16.21 (4.64)	.009
Girls' Readiness to have Sex	8.41 (3.06)	8.35 (2.79)	7.59 (3.01)	.021

Table 5: Means (SD) in personal belief and social norms by age.
 Men's Motivations – PB 15–17 years old are significantly different from the other two groups.
 Girls' Readiness to have Sex – PB 15–17 years old are significantly different from 25 to 70 years old.
 Attributions to Girls' Behaviour – SN 15 to 17 years old are significantly different from 25 to 70 years old. Other groups are not significantly different.
 Men's Motivations – SN 15 to 17 years old are significantly different from 25 to 70 years old. Other groups are not significantly different.
 Girls' Readiness to have Sex – SN 15 to 17 years old are significantly different from 25 to 70 years old. Other groups are not significantly different.

involved in ADTS, and girls are ready to have sex. Table 5 summarizes the differences by age.

Discussion

This measurement development study aimed to fill a gap in the research and practice by developing scales to quantitatively measure both personal beliefs and social norms around ADTS. The items were based on qualitative research and expert rankings, and the resulting *Norms and Attitudes on ADTS Scale* exhibits strong psychometric properties. Each of the three subscales, Attributions to Girls' Behaviour, Girls' Readiness to have Sex, and Men's Motivations within each of the two domains (personal beliefs and social norms) illustrate good factor structure, acceptable internal consistency reliability, and are supported by the significance of hypothesized group differences.

The Attributions to Girls' Behaviour captures girls' reasons for engaging in ADTS (protection, financial stability) as well as the processes perceived to be related to engaging in ADTS (spending a lot of time on the street, responding to men's advances, wearing short skirts). Men's Motivations reflects the role of men's power and pleasure from engaging in ADTS. The stage of development of a girl's body and her age in relation to being ready to have sex is captured in the third subscale. Unsurprisingly, the subscales are consistent with the qualitative research in Brazil that informed the development of the items.¹⁴

The findings are also consistent with existing research in other contexts. For example in their systematic review of social norms and beliefs related to sexual exploitation of children and adolescents, Buller et al. found that across multiple settings community members expect the exchange of sex for favours or goods, accept the need for sex as a way to provide for one's needs, and that young people (typically girls) are stigmatized or blamed for engaging in these sexual

relationships.²⁷ These concepts are captured in the Attributions to Girls' Behaviour subscale. Howard-Merrill et al. highlights similar dimensions of men's motivations and experiences of ADTS, including men's 'uncontrollable' sexual urges, and perceived benefits of intergenerational relationships for men (and girls), including a preference for younger bodies and more pleasurable or novel sexual experiences.¹⁵ These authors point out that the lack of negative social sanctions against perpetrators of sexual exploitation of children and adolescents has roots in beliefs that girls' readiness for sex is determined by age or physical development and that intergenerational relationships can benefit both parties. This correspondence between the key dimensions of the *Norms and Attitudes on Age-Disparate Transactional Sex Scale* and findings across multiple settings suggests the scale may be applicable in contexts beyond Brazil.

The validity of the NAATSS is also supported by differences in the scores by respondent's age, sex, and participation in transactional sex relationships. Younger people (15–17 year olds) are significantly more likely to have personal beliefs that see girls as being ready to have sex and men being more motivated by power and pleasure than the older groups. The younger age group sees the social norms for Girls' Readiness to have Sex, Men's Motivations, and Attributions to Girls' Behaviour as stronger more entrenched social norms than the older groups. In general, women were more likely than men to think girls are looking to be involved in ADTS and are ready to have sex, in their personal beliefs. Women are more likely than men to perceive the community as supporting girls' role in ADTS and women were less likely than men to perceive that the community believes girls are ready to have sex. Respondents that have engaged in transactional sex are more likely than those with no prior experience to have personal beliefs that condone ADTS, consistent with other studies of masculinities, showing associations between

men's attitudes and their behaviours.^{28,29} As compared to people who have not had prior transactional sex experience, those that do have prior experience perceive that social norms endorse men as being more actively involved in ADTS for power and pleasure and girls as actively involved in ADTS but not ready to have sex.

A unique contribution of this measure is that it allows us to compare personal attitudes and social norms. Consistent with other studies, in general we find that personal attitudes are more positive than perceived community norms.³⁰ Specifically, scores for personal beliefs around attributions to girls' behaviours and girls' readiness for sex were more equitable, or less supportive of ADTS than the perceived social norms. This difference between personal attitudes and social norms creates a potential space for intervention, emphasizing that many individuals do not personally condone ADTS, which could catalyse opportunities to question community norms. Interestingly, this was not the case for the men's motivations subscale, where the mean score on the personal beliefs and social norms domains were the same, suggesting personal beliefs and social norms are aligned, generally agreeing with men's motivations for engaging in ADTS. Unlike the other subscales, there were no significant differences between men and women on personal beliefs or social norms around men's motivations. Together, these findings highlight the need for interventions to transform the deep-rooted norms about men, sexuality, and power that underpin the lack of social sanctioning of men who engage in ADTS.²⁷

The NAATSS could be used to measure changes in social norms and personal beliefs for these interventions. The psychometric properties of the subscales are good and the scores do not exhibit ceiling effects, supporting the NAATSS as a sensitive measure.

Although this psychometric evaluation has several strengths, including a mixed methods design to develop the measure and a large sample size to test the measure, it has limitations. The main limitation is that the study does not include a separate validation sample. The work reported here is just the first step in validating the NAATSS. An important next step is to collect data from a new sample and perform a confirmatory factor analysis using the observed factor structure from this study. This would then determine if the factor pattern for the NAATSS can be cross validated in a new sample of people. Although the findings are consistent with the global literature, additional studies should be undertaken to increase the generalizability of the findings beyond the setting of Brazil. In addition, several important concepts in the broader literature, such as men's primary role as a provider and associated social pressures were not included in the final scale. While this concept did not emerge with respect to ADTS social norms in this setting, these may be important correlates of ADTS social norms.

Conclusions

This paper makes a unique contribution to the growing literature on social norms driving the practice of ADTS, by presenting a new instrument to quantitatively measure both personal beliefs and social norms. It includes three subscales Attributions to Girls' Behaviour, Girls' Readiness to have Sex, and Men's Motivations within each of the domains of personal beliefs and social norms. The scales show strong psychometric properties and appear to be sensitive enough to detect changes making it a good measure to assess the impact of interventions to address ADTS. The subscale content is consistent with global norms, suggesting its applicability in contexts beyond Brazil. Finally, the known group validity findings highlight a space for GBV and gender transformative intervention programs, building on the gap between personal attitudes and perceived norms, especially around men's motivations.

Declaration of interests

The authors declare that they have no competing interests.

Contributors

NP, AMB, CI, RL, LA, JLF, GL, BC and LC designed the study. AMB secured funding for the study. CI and LC coordinated the research in Rio de Janeiro. CI and LC were responsible for implementing data collection. NP, LA and JLF verified the data and conducted the psychometric analysis. RL, CI, LC, AMB and NP led the interpretation of the study findings. NP, RL, AMB, CI, LA, GL, BC and LC revised and finalized the manuscript.

Acknowledgments

We would like to thank the residents of Cidade de Deus, Complexo da Maré and Rocinha for their participation. We would also like to thank the community mobilisers and data collection team for their support.

Data sharing

Please contact the lead author to establish a data sharing agreement to gain access to a limited dataset that ensure confidentiality of the participants.

References

- Hawkins K, Price N, Mussá F. Milking the cow: young women's construction of identity and risk in age-disparate transactional sexual relationships in Maputo, Mozambique. *Glob Public Health*. 2009. <https://doi.org/10.1080/17441690701589813>. Published online.
- Wyrod R, Fritz K, Woelk G, et al. Beyond sugar daddies: intergenerational sex and AIDS in Urban Zimbabwe. *AIDS Behav*. 2011;15(6):1275–1282. <https://doi.org/10.1007/s10461-010-9800-2>.
- Toska E, Cluver LD, Boyes ME, Pantelic M, Kuo C. From "sugar daddies" to "sugar babies": quantitatively testing the pathway between inequitable sexual relationships, condom use, and

- adolescent pregnancy in South Africa. *Sex Health*. 2015. Published online.
- 4 Krisch M, Averdijk M, Valdebenito SEM. Sex trade among youth: a global review of the prevalence, contexts and correlates of transactional sex among the general population of youth. *Adolesc Res Rev*. 2019;4(2):115–134.
 - 5 Kirkeby KM, Lehmilller JJMM. Sugar dating, perceptions of power, and condom use: comparing the sexual health risk behaviour of sugar dating to non-sugar dating women. *J Sex Res*. 2021. <https://doi.org/10.1080/00224499.2021.1962782>. Published online.
 - 6 UNICEF. Child marriage. Monitoring the situation of women and children. Published 2021. https://data.unicef.org/wp-content/uploads/2015/12/Child-marriage-database_Mar-2018.xlsx.
 - 7 Taylor AY, Murphy-Graham E, Van Horn J, Vaitla B, Del Valle Á, Cislighi B. Child marriages and unions in Latin America: understanding the roles of agency and social norms. *J Adolesc Health*. 2019;64:S45–S51. <https://doi.org/10.1016/j.jadohealth.2018.12.017>.
 - 8 UNICEF. Child marriage. Published 2019. <https://data.unicef.org/topic/child-protection/child-marriage/>.
 - 9 Buller AM, Schulte MC. Reproductive Health Matters an international journal on sexual and reproductive health and rights Aligning human rights and social norms for adolescent sexual and reproductive health and rights Aligning human rights and social norms for adolescent sexual and reproductive health and rights. Published online 2018. <https://doi.org/10.1080/09688080.2018.1542914>.
 - 10 Wamoyi J, Buller AM, Nyato D, Kyegombe N, Meiksin R, Heise L. “Eat and you will be eaten”: a qualitative study exploring costs and benefits of age-disparate sexual relationships in Tanzania and Uganda: implications for girls’ sexual and reproductive health interventions. <https://doi.org/10.1186/s12978-018-0650-0>.
 - 11 Wamoyi IDJ, Heise L, Meiksin R, Kyegombe N, Nyato ID D, Buller AM. Is transactional sex exploitative? A social norms perspective, with implications for interventions with adolescent girls and young women in Tanzania. Published online 2019. <https://doi.org/10.1371/journal.pone.0214366>.
 - 12 Kyegombe N, Meiksin R, Namakula S, et al. Community perspectives on the extent to which transactional sex is viewed as sexual exploitation in Central Uganda. <https://doi.org/10.1186/s12914-020-00228-w>.
 - 13 Kyegombe N, Meiksin R, Wamoyi J, et al. Sexual and reproductive health matters sexual health of adolescent girls and young women in Central Uganda: exploring perceived coercive aspects of transactional sex Sexual health of adolescent girls and young women in Central Uganda: exploring perceived coercive aspects of transactional sex. *Reprod Health Matters*. 17(00):28(1). <https://doi.org/10.1080/26410397.2019.1700770>.
 - 14 Ignacio CF, Araújo D, Ruge E, et al. Community perceptions of transactional sex with children and adolescent girls, a qualitative study in favelas of Rio de Janeiro. *Glob Public Health*. 2020;15(3):424–437. <https://doi.org/10.1080/17441692.2019.1685559>.
 - 15 Howard-Merrill L, Wamoyi J, Nyato D, Kyegombe N, Heise L, Buller AM. Culture, health & sexuality “i trap her with a CD, then tomorrow find her with a big old man who bought her a smart phone”. Constructions of masculinities and transactional sex: a qualitative study from North-Western Tanzania. Published online 2020. <https://doi.org/10.1080/13691058.2020.1832259>.
 - 16 Cislighi B, Heise L. Theory and practice of social norms interventions: eight common pitfalls. *Glob Health*. 2018;14(1):83. <https://doi.org/10.1186/s12992-018-0398-x>.
 - 17 Costenbader E, Cislighi B, Jo Clark C, et al. Social norms measurement: catching up with programs and moving the field forward. Published online 2019. <https://doi.org/10.1016/j.jadohealth.2019.01.001>.
 - 18 Perrin N, Marsh M, Clough A, et al. Social norms and beliefs about gender based violence scale: a measure for use with gender based violence prevention programs in low-resource and humanitarian settings. *Confl Health*. 2019. <https://doi.org/10.1186/s13031-019-0189-x>. Published online.
 - 19 Wamoyi J, Ranganathan M, Kyegombe N, Stobenau K. Improving the measurement of transactional sex in Sub-Saharan Africa. *JAIDS J Acquir Immune Defic Syndr*. 2019;80(4):367–374. <https://doi.org/10.1097/QAI.0000000000001928>.
 - 20 Anunciação L, Da Silva SR, De Almeida Santos F, Landeira-Fernandez J. Redução da Escala Tendência Empreendedora Geral (TEG-FIT) a partir do Coeficiente de Validade de Conteúdo (CVC) e Teoria da Resposta ao Item (TRI). *Rev Eletr Ciênc Adm*. 2018;17(2):192–207. <https://doi.org/10.21529/recadm.2018008>.
 - 21 Haynes SN, Richard DCS. Content validity in psychological assessment: a functional approach to concepts and methods introduction to content validity. 1995;7(3):238–247.
 - 22 Siqueira Malta F, Marques da Costa E. Socio-environmental vulnerability index: an application to Rio de Janeiro-Brazil. <https://doi.org/10.3389/ijph.2021.584308>.
 - 23 Hogarty KY, Hines CV, Kromrey JD, Ferron JMMK. The quality of factor solutions in exploratory factor analysis: the influence of sample size, communality, and overdetermination. *Educ Psychol Meas*. 2005;65(2):202–226. <https://doi.org/10.1177/0013164404267287>.
 - 24 Costello AB, Osborne J. Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Pract Assess Res Eval*. 2005;10:7. <https://doi.org/10.7275/jyj1-4868>.
 - 25 Lorenzo-Seva U. The weighted oblimin rotation. *Psychometrika*. 2000;65(3):301–308.
 - 26 Taber KS. The use of Cronbach’s alpha when developing and reporting research instruments in science education. *Res Sci Educ*. 2018;48:1273–1296. <https://doi.org/10.1007/s11665-016-9602-2>.
 - 27 Buller AM, Pichon M, McAlpine A, Cislighi B, Heise L, Meiksin R. Systematic review of social norms, attitudes, and factual beliefs linked to the sexual exploitation of children and adolescents. *Child Abuse Negl*. 2020;104. <https://doi.org/10.1016/j.chiabu.2020.104471>.
 - 28 Hill AL, Miller E, Switzer GE, et al. Harmful masculinities among younger men in three countries: psychometric study of the man box scale. *Prev Med*. 2020;139. <https://doi.org/10.1016/j.ypmed.2020.106185>. (Baltim).
 - 29 Levto R, Barker G, Contreras-Urbina M, Heilman B, Verma R. Pathways to gender-equitable men: findings from the international men and gender equality survey in eight countries. *Men Masc*. 2014;17(5):467–501. <https://doi.org/10.1177/1097184X14558234>.
 - 30 Levto R, Vlahovicova K, Barker G, Lugano E, Mulokozi. Momentum toward equality: results from the international men and gender equality survey (images) in Tanzania 2018 momentum toward equality: results from the international men and gender equality survey (IMAGES) in Tanzania 4. Accessed June 2, 2021. www.pmundoglobal.org/images.