Measuring female autonomy in Egypt

INTRODUCTION

By many standards, Fatma and Aisha[1] are considered lucky. Both are married well to hard working and considerate men who never beat them, but on many indicators, Fatma and Aisha could be considered repressed. If asked, Fatma would probably agree she is repressed whereas Aisha would deny any repression.

Fatma lives in the rundown *Sayyida Zeinab* neighborhood of Cairo. Her husband works long hours as a taxi-driver and her three children are all teenagers, either in school or working. Fatma would love to work outside the home. Before she married, she worked as a secretary and enjoyed her work. Once married, she stopped working and took care of her young family. Her husband is adamant she should not work, telling her he would be shamed if she did so. Fatma often watches American soap operas on television and envies the freedom Western women have. She also remembers how other women behaved when she did work. When the interviewer, a college student, came to interview her for a survey, Fatma tried to portray herself as modern and progressive. Yes, she said, I do have the final say on visits to family and friends. No, I don't have to ask permission to go to the doctor.

Aisha, living in a small village in Upper Egypt would not even consider working outside the home unless destitute as she firmly believes a woman's place is in the home. She also accepts the constraints placed on her physical mobility and interactions with non-related men as a sign her husband, Ahmed, cares about her. In her interview, Aisha was keen to show the interviewer she was an obedient and good wife. No, she said piously, I am not allowed out by myself, forgetting that within her village she moved

[1] Fatma and Aisha are fictitious characters with the characteristics based on composite respondents.

freely. Yes, she said, my husband decides everything to do with money, although Ahmed always consulted with Aisha.

The above examples highlight the difficulty in measuring female autonomy. Although by many absolute measures, Fatma has more autonomy than Aisha, on a relative scale Fatma is less autonomous since she is unable to achieve the self-determination that she desires. Who is more autonomous? It is possible both Aisha and Fatma would give different answers depending on how the question was phrased and their perceptions of what the interviewer wanted to hear. It is also feasible Fatma and Aisha would give different answers over time due to changing norms of behavior, without any concomitant change in their real autonomy.

This paper will address the difficulties involved in measuring female autonomy, namely the validity and reliability of measures of female autonomy and discusses ways of addressing these problems. Female autonomy features heavily in much discourse on sociological and demographic behavior; it is linked to many health outcomes, independent of other confounding factors such as education and development (Bloom, Wypij and Das Gupta 2001). However, it is an elusive concept that is both hard to operationalize and to quantify as I shall explain below.

In this paper I present the challenges in measuring female autonomy using survey data from Egypt as an example. I first use confirmatory factor analysis (CFA) for each survey year to explore the temporal validity of female autonomy measures. I then analyze the reliability of the various measures of female autonomy based on certain characteristics of the survey interview, for example, whether the presence of a husband or other people distort the results, if there is any clustering by interviewer, and if the degree of cooperation recorded by the interviewer affects the results. Results point to serious problems in the validity and reliability of measures of female autonomy.

MEASURING AUTONOMY: PROBLEMS AND CHALLENGES

The first challenge is to determine how autonomy may be measured and whether autonomy is multi-dimensional or if it can be amalgamated into a meaningful index. Jejeebhoy (2000) parses women's autonomy into five critical dimensions. These are:

1. Knowledge autonomy - awareness of new ideas and exposure to outside world, informed choice.

2. Decision-making autonomy - say in decisions concerning them and family decisions

3. Physical autonomy - no constraints on physical mobility

4. Emotional autonomy - egalitarian power relations, greater bonding/intimacy between spouses

5. Economic/social autonomy - access to and control over economic resources and economic self reliance.

I posit there is a sixth critical dimension of women's autonomy - bodily integrity. This dimension encompasses three crucial factors in many Egyptian women's lives: violence, unwanted pregnancies and female circumcision. Women who are exposed to violence or the fear of violence, especially gender-specific violence such as domestic violence and rape, have less control over their bodily integrity. Similarly, women who are unable to prevent unwanted pregnancies in the first place or who cannot seek safe abortion in the event of an unwanted pregnancy have compromised bodily integrity. Again, this is gender specific and only directly affects women. Female circumcision also often involves women or girls not having autonomy over their own bodily integrity.

Where societies are highly gender stratified (usually patriarchal societies) and gender relations are inegalitarian, women's autonomy is restricted by the social institutions of gender. Examples of such institutions are the roles of men and women, legal and political structures, and marriages and sanctions

when norms are defied. The way proxies of women's autonomy actually capture autonomy is shaped by the context. For instance, the effect of education on autonomy in highly segregated societies may be attenuated compared with less segregated societies. A woman may seek education in order to improve her status in the marriage market rather than reflecting any increased autonomy compared with a less educated woman. Similarly, working outside the home could be symbolic simply of economic necessity rather than any autonomous status. Norms are crucially important in determining the extent to which a woman internalizes appropriate gender-specific behavior and therefore willingly undertakes it, as well as the external force of norms held by others which would compel otherwise unwilling women to comply (England 2000).

Agarwala and Lynch (2006) tackled the challenge of measuring autonomy and used CFA analysis to determine whether items thought to measure autonomy form a reliable measure of true autonomy. They pointed out that a single measure of female autonomy is unrealistic given the multifaceted nature of autonomy. They also note the extremely context-dependent nature of female autonomy and the unsuitability of indirect proxies such as female education and female labor force participation. Their work found that autonomy is indeed multidimensional with autonomy items clustering into distinct dimensions, namely feared and actual violence, views on the legitimacy of violence, family decisions, community involvement and household economics. As a result, they conclude that autonomy is not a concept that translates well across cultures.

Using DHS data, Basu et al. (2005) point out that while 'autonomy' and 'empowerment' have been used interchangeably, they are separate concepts with empowerment leading to autonomy. Basu et al. also point to ostensibly autonomous women who are simply conforming to accepted norms. They try to move away from autonomy as a proxy for responsibility and look at empowerment as both self-indulgence and responsibility. Their results, using various respondent-reported health outcomes, point to empowerment

variables having an overwhelmingly positive effect on health whereas responsibility variables have a negative effect, although the relationship does not hold for children's outcomes. However, Jejeebhoy (2000) defines empowerment as a process, whereas autonomy is a static measure, irrespective of process. In other words, empowerment is the process of increasing autonomy. Since I am looking at cross-sectional data over time, and not true longitudinal data, I believe autonomy at each point in time is the most appropriate measure although at the regional and national level it may be possible to detect a process of empowerment, derived from changes in individual women's autonomy.

Part of the problem with measuring female autonomy is it inevitably involves a certain amount of subjectivity and value judgments. Ayer (1952:108) argues value judgments are not analytic and are therefore not verifiable. However Ayer (1952: 110) also allows for the difference between the expression of feeling and the assertion of feeling, with the assertion of feeling able to be expressed as a proposition.

Weinreb (2004) discusses at length the problems associated with social desirability. Referring to Appadurai's definition of 'ideoscapes' (Appadurai 1996: 33), Weinreb frames discussions about women's autonomy in modern Arab societies as a type of modern discourse evaluating modern freedoms. He further adds this ideoscape is seen as rooted in Western philosophy – despite the long history of feminist activism in the Arab world. Therefore, presenting oneself as autonomous and empowered may be seen as both Western and modern. Where the interviewer is perceived as approving of such traits, then responses may reflect the biases of the interviewer. Social desirability may not simply operate to lead to over-estimation of female autonomy. Women may also present themselves as having less autonomy than they really have in order to conform to social norms and an internalization of their own subservience to men (Neidell 1999; Olson and Rabunsky 1972). It is therefore difficult to make assumptions about whether autonomy is being over or under estimated, since biases may work in

different directions. This difficulty in making assumptions about the direction of bias presents a serious threat to the validity of questions about autonomy and our ability to infer from them regarding true autonomy (Ghuman et al. 2004).

THE SITUATION IN EGYPT

Egypt is a particularly interesting country in which to study women's autonomy. Firstly, it is a country with strong Islamic traditions and also a significant non-Muslim minority. Furthermore, the manifestation of Islam is changing in Egypt, and the emergence of Islamic dress is particularly apparent among young, urban and educated women. Religion for Egyptian women is shaped by the traditional, male-centered system in place in the Arab world, and Islam can be used to legitimize the existing patriarchal system. In many cases, this may even be contrary to Islamic theology, with women not aware their Islamic rights have been violated (Moghissi 1999:40). Many of the expectations of appropriate female behavior in Egypt focus around class and education rather than religion. The conversations of Egyptian Coptic women recorded by Zenie-Ziegler (1988), for example, bear striking resemblance to those of Muslim women.

The resurgence of the veil and traditional Arab dress in Egypt – a prominent visual sign of rising Islamism in Egypt – has been pioneered by young women students in the most elite and male dominated fields of engineering and medicine. These young women are able to distinguish themselves from their uneducated sisters yet preserve an aura of irreproachable morality as they move in mixed gender circles (Abu Lughod 1990). Even the *burqa*, a strong cultural icon representing female oppression in Afghanistan, has been termed 'portable seclusion' because it allowed women to become mobile beyond the confines of the segregated living space (Abu Lughod 2002). Moghissi (1999:42) cautions that while it is important to take into account the personal experiences of women in Islamic societies, the voices of

all women must be heard, particularly where fundamentalism may be forcefully implemented. The discourse of Egyptian women illustrates that women's autonomy and status in Arab society are far more multifaceted than simply issues of patriarchy, oppression and domination.

MEASURING FEMALE AUTONOMY IN EGYPT

In a paper on women's autonomy using the 1988 Egypt DHS, Kishor (1995) points out the multidimensional nature of female autonomy and how forces external to the individual family unit could force women to take on ostensibly autonomous roles while preserving the internal traditional gender roles. The paper identifies three different measures of autonomy. Two of the measures index the degree to which women believe they should have a decision-making role within the domestic and the non-domestic sphere respectively; the third measure indexes the women's degree of realized autonomy. Indices were created by applying weights to responses on questions relating to autonomy. The correlation between the components of the indices was found not to be high, indicating, as suspected, that they were all capturing different aspects of female autonomy. Kishor did find both contraceptive use by women and the relative survival of their children are positively associated with their level of autonomy. She also considered the possible influences on female autonomy and divides them into those resulting from modernization and economic development (such as area of residence, socioeconomic status, education, employment and media exposure of both husband and wife) and culture-dependent influences (such as post-marital residential arrangements, age and type of marriage, number of children and son preference).

Some of the problems with the validity of the measures of women's autonomy in the Egypt DHS have been noted by Weinreb (2004). He points out that in the 1992 Egypt Demographic and Health Survey, women in unrelated marriages reported more autonomy than women in consanguineous marriages. This

finding is important because it is contrary to the theory of Dyson and Moore (1983), based on work in South Asia, whereby women who remain within their natal families experience greater autonomy. Weinreb also notes the EDHS do not measure the kin-related social capital mechanisms through which women can wield authority and affect decision-making. Weinreb found even the limited concepts the EDHS questions do capture are not captured reliably. Firstly, in the 1992 EDHS he found high levels of clustering by interviewer for most of the autonomy items. Secondly, not only did he find clustering but also a relationship between the level of cooperation perceived by the interviewer and the level of autonomy. This finding of course, raises questions of social desirability bias. However, informal conversations with social researchers in Egypt raise the possibility that social desirability works in the opposite direction with women attributing to themselves less autonomy in order to conform to perceived desirable norms.

Data

The data used in this paper are the Egypt Demographic and Health Surveys from 1992, 1995, 2000 and 2005. EDHS provide a rich source of data with many variables that are both indicators of and sources of female autonomy. They are large surveys carried out periodically and intended to be uniform to facilitate cross-national comparisons; they are generally representative at the regional level.

The methodology is similar in each survey, with a three stage sampling process randomly selecting households to be interviewed for the household questionnaire. All ever-married women aged 15-49 who are usual residents or who were present in the sampled households on the night before the interview were eligible for the women's questionnaire. The EDHS have very high response rates. The refusal rate is even lower, since a large proportion of the non-responders were women who were not located by the interviewers. Table 1 presents details on the surveys used.

Table 1: Survey details, 1992-2005

		Year			
		1992	1995	2000	2005
Household	Number	10,760	15,567	16,957	21,972
	Response rate (%)	98.3	99.2	99.1	98.9
Women	Number	9,864	14,779	15,573	19,474
	Response rate (%)	98.9	99.3	99.5	99.5
Overall response rate		97.2	98.5	98.6	98.4

Sample restrictions and concerns

The sample used is restricted to ever-married women; while marriage is still nearly universal in Egypt, the age of marriage is increasing. The increase in age of marriage means younger married women are becoming a more select group, so changes in female for young women over time need to be considered in that context. Another concern is that the 1992 sample did not sample in the frontier governorates (Red Sea, North Sinai, South Sinai, Matruh and New Valley). However, the population of these regions is only around one percent of the weighted sample population and does not significantly change the results.

Based on the six dimensions outlined previously, Table 2 describes the variables used to measure female autonomy.

Table 2: Variables used to measure female autonomy and dimension measured.

Variable	Proxy / direct	Type of autonomy
Age at first marriage.	Proxy	Decision-making
Duration of marriage	Proxy	Decision-making
Need approval to see doctor	Direct	Decision making, physical
Items has final say/last word	Direct	Decision making
Contraceptive decision maker	Direct	Decision making
Decides how to spend money	Direct	Decision making, economic/social
Age difference between partners	Proxy:	Emotional
Relationship to household head	Proxy	Emotional
Relationship to husband	Proxy	Emotional
Any emotional violence	Direct	Emotional
Family members eat together	Direct	Emotional
Respondent circumcised.	Direct	Bodily integrity

Reasons for wife beating	Proxy	Bodily integrity
Attitudes to female circumcision	Proxy	Bodily integrity
Experience of domestic violence	Direct	Bodily integrity
Exposure to outside media	Direct	Knowledge
Employed outside the home	Direct	Knowledge, economic/social, physical
Education	Proxy	Knowledge, Economic/social
Various questions on financial resources	Direct	Economic/social
Various questions on mobility	Direct	Physical

While the direct measures are self-explanatory, the proxy measures require some justification (Table 3).

Table 3: Justification of proxy measurements of female autonomy

Variable	Justification
Education	Confusion exists regarding the mechanisms through which female education increases autonomy, the extent to which education increases autonomy, and the cross-cultural differences in the influence of education. However, there is consensus that in general, female education increases women's autonomy (Jejeebhoy 2000)
Age at first marriage.	Women married at younger ages will probably have less autonomy than women married later.
Duration of marriage	Newly-wed women entering a new household will most likely have a lower status than women married for longer periods of time.
Number of sons	A woman's status could be elevated by both the number of children and the number of sons that she has borne. Since the conjugal bond in patriarchal societies is weak, marriages are seen as inherently unstable, and having children is the major way that a woman 'ties' her husband to her (Inhorn 1996:111,253). Furthermore, older sons could operate as actors in their own right to support their mothers.
Age difference between partners	The closer the husband and wife are in age, then the more egalitarian the marriage is likely to be.
Relationship to household head.	A woman's relationship to the head of the household will impact her status in the household and the degree of autonomy accorded to her. Proxy for emotional autonomy in particular.
Relationship to husband.	Although consanguineous marriage may represent a certain adherence to traditional mores that may limit female autonomy, the wife remains within her natal family and thus may have a higher status than a women marrying exogenously. Given the importance of kinship networks, a woman who remains close to her natal kin will usually have more autonomy (Dyson and Moore 1983).
Respondent circumcised and attitudes to circumcision	I am assuming that the minority of women who did not undergo circumcision will be a select group with a higher level of autonomy. In particular, circumcision is a proxy for bodily integrity autonomy. Attitudes to female circumcision are also included since non-circumcised women are a small and select group. Further, circumcision is a retrospective event, where the woman, as a child, is not an actor with any influence and may not, therefore, reflect current autonomy.

The weighted distributions of the autonomy variables are shown in Table 4.

Table 4: Weighted distribution of variables used to measure female autonomy

Variable		1992	1995	2000	2005
Age at first marriage (years)		18.7	18.6	19.0	19.5
Relationship to husband	No relation	0.60	0.55	0.62	0.66
	First cousin	0.25	0.27	0.22	0.18
	Second cousin	0.15	0.12	0.10	0.07
	Other		0.06	0.06	0.09
Relationship to household head	Head/wife	0.77	0.79	0.81	0.81
	Daughter-in-law	0.13	0.13	0.12	0.11
	Other	0.10	0.08	0.04	0.08
Education	None	0.48	0.43	0.42	0.34
	Primary	0.26	0.25	0.18	0.16
	Secondary and higher	0.26	0.32	0.40	0.51
Age at first birth		20.28	20.29	20.68	21.13
Cannot read		0.60	0.56	0.49	0.40
Reads newspaper	Not at all	0.76	0.77	0.63	0.63
	Less than once a week			0.11	0.18
	At least once a week	0.25	0.23	0.14	0.10
	Almost every day			0.12	0.09
Listens to radio	Not at all	0.33	0.38	0.16	0.18
	Less than once a week			0.12	0.10
	At least once a week			0.22	0.13
	Almost every day	0.67	0.62	0.50	0.60
Watches TV	Not at all	0.27	0.18	0.05	0..04
	Less than once a week			0.02	0.02
	At least once a week			0.05	0.05
	Almost every day	0.73	0.82	0.89	0.90
Respondent currently working		0.22	0.17	0.16	0.21
Age difference between spouse (years)		7.5	7.4	7.1	6.9
Contraceptive decision maker	Respondent alone	0.10	0.13		0.14
	Jointly with someone else	0.56	0.63		0.82
	Respondent not involved	0.34	0.24		0.04
Husband's earning decision maker	Respondent alone				0.04
	Jointly with someone else				0.66
	Respondent not involved				0.27
Who decides how to spend money	Respondent alone	0.13	0.06	0.36	0.26
	Jointly with someone else	0.29	0.42	0.60	0.68
	Respondent not involved	0.58	0.52	0.04	0.05
Final say on own health care	Respondent alone		0.24	0.33	0.26
	Jointly with someone else		0.51	0.25	0.53
	Respondent not involved		0.25	0.42	0.21
Final say on large household purchases	Respondent alone			0.05	0.07
	Jointly with someone else			0.34	0.47
	Respondent not involved			0.61	0.46
Final say on day to day household purchases	Respondent alone			0.46	0.60
	Jointly with someone else			0.23	0.20

Variable		1992	1995	2000	2005
	Respondent not involved			0.30	0.20
Final say on visits to family	Respondent alone	0.03	0.07	0.12	0.14
	Jointly with someone else	0.37	0.34	0.60	0.59
	Respondent not involved	0.59	0.59	0.28	0.27
Final say on budget	Respondent alone		0.13		
	Jointly with someone else		0.46		
	Respondent not involved		0.41		
Final say on having a child	Respondent alone	0.06	0.03		
	Jointly with someone else	0.54	0.74		
	Respondent not involved	0.40	0.13		
Final say on food to be cooked	Respondent alone		0.67		
	Jointly with someone else		0.18		
	Respondent not involved		0.15		
Final say on wife's employment	Respondent alone	0.06			
	Jointly with someone else	0.25			
	Respondent not involved	0.69			
Wife beating justified if she goes out without telling him					0.59
Wife beating justified if she neglects children			0.52		0.59
Wife beating justified if she argues with him/answers back			0.70		0.62
Wife beating justified if she refuses to have sex with him			0.36		0.34
Wife beating justified if she burns the food			0.29		0.19
Wife bearing justified if she talks to men			0.66		
Wife beating justified if she wastes money			0.46		
Needs to ask someone before seeing doctor			0.80		
Can go outside home	Alone	0.84	0.88		
	With others	0.04	0.08		
	Not permitted	0.13	0.04		
Can go to market	Alone		0.75		
	With others		0.05		
	Not permitted		0.20		
Can go to health unit	Alone		0.64		
	With others		0.33		
	Not permitted		0.03		
Can go on picnic	Alone		0.16		
	With others		0.45		
	Not permitted		0.39		
Can visit relatives/friends	Alone		0.60		
	With others		0.36		
	Not permitted		0.04		
Family members eat together			0.94		
Circumcised			0.98	0.97	0.96
Hygiene advantage of FGM				0.29	
Social acceptance advantage of FGM				0.04	
Better marriage prospects advantage of FGM				0.04	
Preserves virginity advantage of FGM				0.09	
Increases man's pleasure advantage of FGM				0.01	

Variable	1992	1995	2000	2005
Religious approval advantage of FGM			0.12	
Reduced sexual desire advantage of FGM			0.32	
Traditions advantage of FGM		0.75	0.57	
Fewer medical problem benefit of no FGM			0.07	
Avoiding pain benefit of no FGM			0.10	
More female sexual pleasure benefit of no FGM			0.06	
More male sexual pleasure benefit of no FGM			0.05	
Follows religion benefit of no FGM			0.02	
Circumcision should continue		0.83	0.75	0.68
Men want circumcision to continue				0.55
Husband prefer circumcised wife		0.76		0.62
Circumcision prevents adultery		0.42		0.54
Circumcision makes childbirth more difficult		0.05		0.13
Circumcision can lead to girl's death		0.23		0.33
Circumcision causes fertility problems		0.07		
Circumcision lessens sexual satisfaction		0.28		
Spouse ever humiliated her				0.16
Spouse ever threatened her with harm				0.05
Ever any emotional violence				0.16
Spouse ever pushed or shook her				0.24
Spouse ever slapped her				0.27
Spouse ever punched her				0.12
Spouse ever kicked her				0.05
Experienced any less severe violence				0.32
Experienced any severe violence				0.01
Experienced any sexual violence				0.06
Experienced any beating		0.36		

VALIDITY OF FEMALE AUTONOMY

The first aim of this paper concerns the validity of the variables potentially used to capture women's

status and autonomy. Validity has multiple forms depending on the research question or type of

inference being made (Bryant 2000: 102). In this case, I am looking at construct validity, i.e. whether a

given measure actually assesses the underlying conceptual variable it is intended to assess (Bryant 2000:

111) and whether this relationship is true across time. In other words, are the measures I am using

accurately capturing the concept of female autonomy, and is there one model that can be used at

different time periods?

There are strong theoretical reasons for believing that female autonomy is not a single measure but encompasses many different aspects of a woman's life. There is little value in creating a single index of female autonomy; rather, I test to see if the dimensions already isolated are indeed uni-dimensional and I identify the variables which can be used to measure each of these dimensions. Given the multidimensional nature of female autonomy, CFA can be used to describe the components of female autonomy with a summary of each dimension. These dimensions are represented by factors formed by clustering variables into homogeneous sets that are relatively independent of one another. Further, since many of the variables used to capture female autonomy are correlated, CFA is also a data reduction tool. It removes redundancy and represents correlated variables with a smaller set of 'stronger' variables. One important proviso is that CFA cannot prove what I am measuring is indeed female autonomy. I am assuming there is a concept such as female autonomy, made up of a number of dimensions and I am assuming the correlation between certain groups of hypothesized variables is evidence of its existence. If this correlation is spurious, then this inference will be mistaken, hence the importance of strong theoretical foundations (Garson 2007).

While there are strong *a priori* theoretical justifications for determining the dimensions comprising female autonomy, it is harder to always provide equally strong justifications for choosing among the various variables that could measure female autonomy. Therefore, the variables associated with female autonomy are examined, together with the theoretical basis for including them. Although I hypothesize the variables used will capture only one dimension, I do not limit the model to only one factor, thus allowing the data to drive the final number of factors within each dimension. I also use CFA to address issues of construct validity across time. We know the concept of autonomy is culturally specific (Agarwala and Lynch 2006); by the same reckoning we can also expect the concept of autonomy to be temporally specific. Could a model of autonomy developed for 2005 be applied to 1992? What are the implications for measuring changes in autonomy over time? This is an important question, given that

empowerment is defined as positive changes in autonomy over time – but could empowerment simply represent a change in the conceptualization of autonomy rather than any substantive change in autonomy itself?

Table A1 in the appendix summarises the variables used in the CFA models and the model dimensions are visually presented in the appendix.

Bodily integrity autonomy

The bodily integrity dimension involved questions on circumcision and violence. The comparability of bodily integrity autonomy across years is compromised since not all the questions were asked in every year. In 1992, no questions were asked on either topic. It is clear violence is an important component of bodily integrity autonomy. In both 2005 and 1995, when questions on violent experiences and beliefs on violence were asked, they form separate factors in the final models.

The questions on circumcision do not seem comparable across years. I would posit this is due to both differences in the questions asked and also the change in perceptions of circumcision between 1995 and 2005. Surprisingly, however, the prevalence of circumcision has decreased only very slowly over the decade in question – 97.0% of ever-married women were circumcised in 1995 compared with 95.8% in 2005. Female circumcision has been officially banned in Egypt since 1996. Since the youngest women in the 2005 Egyptian DHS were born in 1990 and since circumcision usually takes place after the age of five, it is reasonable to assume it is still early to see any significant effect of the 1996 outlawing of female circumcision in the 2005 DHS. Further, women in the EDHS are ever-married, so the selectivity of the youngest women is increasing as age of marriage increases in Egypt.

In 2000, no questions were asked on violence and bodily integrity autonomy centered around questions on circumcision. Nonetheless, in contrast to 2005, circumcision was not uni-dimensional and could be separated into four separate factors[2].

The model for 1995 appeared to be more similar to 2005, with beliefs on violence clustering as one factor. For the most part, the circumcision variables also constituted one factor, with the exception of two variables that involve questions referring to the effect of circumcision on childbirth or fertility. I would venture that since high fertility is valued in traditional communities which also value circumcision, having a negative opinion on circumcision due to its effects on a woman's reproductive health is substantively different to those referring to the effect on a woman's sexuality.

Decision making autonomy

The decision making autonomy models looked at the autonomy a woman has to make her own decisions. Some of the variables are direct reports from the respondent on her ability to either make decisions or have the final say. Others, such as age at marriage, marital duration and the number of sons, are proxies for decision-making authority by reflecting a woman's power within the household.

In all the models, marital duration and the number of sons were important variables that clustered together as one factor. In 1995, 2000 and 2005, age at marriage was also an important variable – either by itself or together with control of money. In 1992, age at marriage loaded poorly and was dropped from the final model. Final say items tended to cluster together; they formed one dimension in 2005 (four items), 2000 (five items) and 1992 (seven items), with the eight items in 1995 forming two

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[2] The first factor was tradition which included whether the woman was circumcised and whether tradition is one of the advantages of FGM. The second factor referred to social advantages associated with circumcision. The third factor revolved around the control of female sexuality as a reason for circumcision and the fourth factor involved questions loosely centering on health issues of circumcision.

dimensions. The decision-making model appears to be fairly comparable across years, taking into

account differences in the exact questions being asked in the different surveys.

Knowledge autonomy

Knowledge autonomy models are easier to directly compare since they all include the same five

variables. However, the dimensions did not turn out the same in every year. In 2005 and 1995,

knowledge autonomy was uni-dimensional. In 2000 and 1992, knowledge autonomy had two

dimensions – outside exposure and media exposure. Newspaper reading, education and working outside

the home were included as the outside exposure dimension. Newspaper reading was considered to be

indicative of a certain level of exposure to the outside world, similar to education, rather than TV and

radio which are easily accessible by all. These differences raise questions about the temporal validity of

models of female autonomy – possibly due to social changes, changes in how the respondent perceives

the questions and also the self-reinforcing nature of knowledge autonomy (i.e. exposure to the outside

world through education and the media may not only indicate autonomy but the exposure itself may

causally increase autonomy albeit not specifically the knowledge dimension of autonomy).

Socioeconomic autonomy

Models of socioeconomic autonomy only fitted the data for 2005 and 1995, in other words, in those

years the factors identified as representing socioeconomic autonomy were not sufficiently correlated.

Although in 1995, there was an additional variable, whether the husband discusses money matters with

the spouse, it does appear the models are comparable for both 2005 and 1995.

Emotional autonomy

As for socioeconomic autonomy, the emotional autonomy model also only fit the data for 2005 and 1995. Similarly to socioeconomic autonomy, both 2005 and 1995 yielded a uni-dimensional model, with 1995 having one additional variable.

Socioeconomic and emotional autonomy

In both 2000 and 1992, the separate socioeconomic autonomy and emotional autonomy models did not fit the data. Therefore, I decided to merge the models which resulted in a far better fit. In 2000, the merged model had three dimensions; one socioeconomic, one relating to the number of sons and the third relating to the household power a woman has. In 1992, the model was two dimensional, with the number of sons included in the household power dimension.

Physical autonomy

The final model looked at physical autonomy. The variables divided into two dimensions I named social mobility (to go outside the home with no particular purpose and to go on visits) and functional mobility, where the respondent has a specific function to carry out (to go to the market, to go the health unit and to go to a picnic). In 1992, only one question was asked – whether the respondent can go out the house alone so no analysis was performed.

Table 5: Summary of results of one dimensional models

	Final model factors	Model fit			Notes
		Chi-square p	RMSEA	RMSR	
2005					
Bodily integrity	Three factors: 1) Experience of violence 2) Beliefs on legitimacy of violence 3) Circumcision – beliefs and experience	<0.001	0.056	0.0211	Dropped 'circumcision makes childbirth more difficult' and 'circumcision can lead to girl's death' due to poor loading and improved model fit. Four factor model fitted slightly better but three factor had better theoretical justification
Decision making	Three factors: 1) Age at marriage and money 2) Marital duration and sons 3) Final say	< 0.001	0.022	0.009	Dropped 'contraceptive decision maker' due to poor loading and improved model fit.
Knowledge	One factor:	0.011	0.011	0.011	Dropped 'newspaper reading' due to poor loading and improved model fit.
Emotional	One factor	<0.01	0.019	0.015	Only loaded on one factor
Socioeconomic	One factor	<0.01	0.060	0.055	'Money' dropped due to poor loading and greatly improved model fit.
2000					
Bodily integrity	Four factors: 1) Tradition 2) Social 3) Female sexuality 4) Health concerns	<0.01	0.016	0.023	Dropped 'circumcision should continue', 'reasons for FGM: religious approval', 'benefits of no FGM: more female sexual pleasure', 'benefits of no FGM: more male sexual pleasure', 'benefits of no FGM: follows religion' Five factor model fitted data very well but trouble theoretically
Decision making	Three factors: 1) Age at marriage 2) Marital duration and sons 3) Final say	<0.01	0.033	0.010	Dropped 'contraceptive decision maker' due to poor loading and improved model fit. Dropped 'money' due to improved model fit and rotated factor loading greater than one.
Knowledge	Two factors: 1) Educational 2) Media exposure	<0.01	0.034	0.007	
Emotional	Zero factors.				

	Final model factors	Model fit			Notes
		Chi-square p	RMSEA	RMSR	
Socioeconomic	Zero factors.				
Emotional, Socioeconomic	Three factors: 1) Education, working and money 2) Sons (negative) 3) Household power	<0.01	0.049	0.016	Merged variables from the two dimensions. Dropped 'relation to husband' because loaded poorly but worsened model fit so included in final model.
1995					
Bodily integrity	Three factors 1) Violence 2) Circumcision 3) Fertility control				Dropped 'FGM deceases sexual satisfaction', 'FGM prevents adultery', 'Husband justified in beating wife if wife refuses sex' due to poor loading and improved model fit.
Decision making	Four factors: 1) Age at marriage, money 2) Sons and marital duration 3) Final say 1 4) Final say 2	<0.01	0.091	0.020	Dropped 'permission to visit doctor', 'final say on having children', 'final say on food to be cooked'
Knowledge	Two factors: 1) Educational 2) Media exposure	<0.01	0.018	0.009	
Emotional	One factor	<0.01	0.000	0.059	
Socioeconomic	One factor	0.03	0.024	0.016	Dropped 'education' due to improved model fit
Physical	Two factors 1) Social mobility 2) Functional mobility	<0.01	0.036	0.016	Variables tended to load well on both factors.
1992					
Decision making	Two factors: 1) Marital duration and sons 2) Final say	<0.01	0.079	0.030	Dropped 'age at first marriage'
Knowledge	One factor	<0.001	0.097	0.073	
Emotional	Zero factors				
Eco-social	Zero factors				
Emotional, socioeconomic	Two factors: 1) Socioeconomic 2) Household power	<0.001	0.028	0.021	Dropped 'age difference' due to poor loading and improved model fit. 'Husband relation' also loaded poorly but omission worsened model fit so included.

	Final model factors	Model fit			Notes
		Chi-square p	RMSEA	RMSR	
Physical	One variable				

All the chi-squares are highly significant, with a significant chi-square usually indicating a lack of fit. However, according to Marsh and Balla 1994, and Raykov 1998, the chi-square statistic is inflated for large sample sizes and, for very large sample sizes nearly all models are rejected. Since I am using large datasets, I decided to ignore the chi-square and use RMSEA and RMSR as better indicators of model fit.

It is clear that female autonomy is a dynamic concept that is in constant flux in response to societal changes. Further, the measurement of female autonomy is sensitive to both the variables used and relatively small differences in wording of questions. These differences raise difficult questions regarding the validity and reliability of questions on female autonomy. Even models where exactly the same question was asked show significant differences in the dimensionality

REACTIVITY OF RESPONSES

Reactivity in social surveys refers to the extent and magnitude of the reaction of the respondent to the survey itself. One of the main weaknesses of questionnaire-based social surveys is their reactivity, partly due to the interaction between interviewer and respondent (Singleton and Straits 2005). This is an even greater concern when measuring socially loaded concepts such as female autonomy. The interviewer-respondent reaction can work through the interviewer communicating her expectations of the respondent to the respondent. For example, an interviewer could expect an uneducated, rural woman to have limited autonomy. Respondents could respond to interviewer characteristics and change their answers accordingly.

A fixed effects ANOVA, controlling for type of region of residence, found that relatively high proportions of variance were between interviewers, far higher than would normally be expected. This proportion was greater for controversial and subjectively reported variables such as views on wife beating, beliefs on female circumcision, who has the final say on various items and experience of domestic violence. In many cases, more than ten percent of variance was between interviewers. Surprisingly even seemingly objective measures also had significant variation between interviewers, although at lower levels. For example, the question asking whether the respondent is currently working had about one percent of the variance due to variance between interviewers. This may seem like a small amount but it is highly statistically significant even after controlling for the type of region of residence, indicating the presence of some interviewer bias (although it is considered an acceptable level of bias, the presence of any interviewer bias in a seemingly objective question is surprising).

Using a random effects ANOVA model, with interviewers as the random variable, it is possible to estimate the interviewer effect through the intra-class coefficient (Weinreb 2004).

$$y_{ijk} = \alpha + \beta x_{ijk} + \mu_j + \mu_k + e_{ijk}$$

for the ith individual, within the jth region interviewed by the kth interviewer, where y_{ijk} is a function of constant α, explanatory variables x and association coefficients β, and an individual error term $e_{ij)}$. Here μ_j is a random departure due to region j, μ_k is a random departure due to interviewer k. Each of these terms and $e_{i(jk)}$ are random quantities whose means are assumed to be equal to 0. In cases where the dependent variable is a dichotomy, $y_{i(jk)}$ would be replaced by $\log\{\pi_{ijk}/(1-\pi_{ijk})\}$ where

$$\pi_{ijk} = \frac{\exp(\alpha + \beta x_{ijk} + \mu_j + \mu_k)}{1 + \exp(\alpha + \beta x_{ijk} + \mu_j + \mu_k)}$$

Table 6: Intraclass coefficients (percentages)

	1988	1992	1995	2000	2005
Age at first marriage	0.0	0.0	0.0	2.6	1.0
Relationship to husband	1.3	2.2	1.2	2.9	3.8
Relationship to household head		2.0	1.6	0.6	3.4
Number of children ever born	0.0	0.0	0.0	0.0	9.7
Age at first birth	0.1	0.0	0.0	3.7	1.7
Education	0.0	10.2	4.5	2.7	1.0
Literacy	1.9	3.0	1.9	2.0	3.0
Read newspaper			4.7	5.7	11.3
Listen to radio			**10.8**	**18.9**	**22.2**
Watch TV				**12.8**	**20.2**
Marital duration	0.0	0.0	0.0	0.2	5.8
Respondent currently working	1.8	6.5	3.2	2.8	5.6
Age difference between spouses		0.0	0.0	1.6	0.9
Decision maker for contraception					**2.64**
Decides how to spend money			**10.6**	10.0	1.6
Decides how to spend husband's money					5.1
Final say items		**11.7** **7.2** **7.7** **11.1** 6.9 **13.8** **9.3**	+ **8.0** **8.6** **15.7** **8.2** **21.8** **31.9**	**43.0** **17.1** **37.2** **35.2**	**32.7** **23.5** **26.8** **27.1**
Reasons for wife-beating			+ **22.1** **30.6** **25.7**		**19.0** **19.0** **18.5** **20.0** **26.7**
Mobility items		**14.7**	**29.7** **41.2** **40.1** **43.2** **34.4**		
Has a bank account			5.9		**10.0**
Circumcised			**12.2**	**18.8**	**21.7**
Intends to circumcise daughters			**42.4**	**8.3**	**12.5**
Beliefs on circumcision			5.8 **11.9** 6.8 **18.8** **23.5** **14.9** **19.4**	**15.3** **39.1** **25.8** **24.2** **29.7** **22.7** **18.0**	**13.3** **13.3** **17.9** **29.3** **25.9** **20.6** **21.8**

	1988	1992	1995	2000	2005
			17.6	**16.7**	
				30.2	
				22.3	
				30.5	
				32.5	
				38.6	
				10.1	
				14.7	
Experience of domestic violence					**12.4**
					17.1
					11.8
					13.3
					16.2
					2.4
					34.0
					14.3
					11.7
					18.3
					20.7

+ from woman's status module

Some interviewer-related error is to be expected, but this value should be less than seven percent (Fowler and Mangione 1990:27-28) and I have highlighted in bold the intra-class coefficients above seven percent in Table 6. As may be seen, the variables often used to determine female autonomy are those showing high levels of clustering by interviewer. For some of the mobility items asked in 1995, 40 percent or more of the total variance is associated with interviewers. This would indicate we cannot assume the respondents of a particular interviewer are independent but are likely correlated with one another.

Another indication there may be problems with the reliability of female autonomy is the relationship between how cooperative the interviewer perceives the respondent to be and the level of autonomy, as shown by Weinreb (2004). Using the random effects model specified above, I expanded the model to include a predictor variable, level of cooperation. Each measure of female autonomy was divided into a dichotomous variable – autonomous or not

(the exact values associated with each are shown in the appendix – Table A2). Table 7

shows, for the most part, respondents coded as more cooperative were also more autonomous.

This could, of course, represent the true state of affairs with less autonomous women really

less cooperative. However, the results also suggest interviewers' opinions themselves are

influencing the results. It is also possible interviewers coded less autonomous women as less

cooperative due to the social distance between themselves and the respondents. Both of these

last two scenarios are feasible based on the results, and both are of concern to researchers of

female autonomy. It does appear the situation is improving over time. For example, looking

at the coefficients of final say items associated with different cooperation levels in 1992 and

2005, the magnitude of the coefficients is greatly reduced, although they remain statistically

significant. It should be remembered sample sizes are large, rendering even relatively small

differentials as statistically significant.

Table 7: Coefficients of interviewer determined level of cooperation, random effects regression analysis.

	1988			1995			2005		
	Poor	Fair	VG	Poor	Fair	VG	Poor	Fair	VG
Age at first marriage	-0.54***	-0.50***	0.52***	-0.62***	-0.27***	0.31***	-0.37**	-0.28***	0.18***
Relationship to husband	-0.41***	-0.20***	0.13*	-0.06	-0.06	0.10	-0.04	-0.13	0.04
Relationship to household head				-0.07	0.15	0.36***	-0.43**	-0.14	0.18***
Age at first birth	-0.56***	-0.35***	0.31***	-0.04	-0.05***	0.09***	-0.06*	-0.05***	0.05***
Education	-2.18***	-1.26***	1.02***	-0.70***	-0.43***	0.79***	-0.69***	-0.52***	0.45***
Literacy	-1.82***	-1.08***	0.95***	-0.79***	-0.42***	-0.69***	-1.07***	-0.60***	0.51***
Read newspaper				-0.82**	-0.40***	0.82***	-0.41**	-0.32***	0.54***
Listen to radio				-0.76***	-0.27***	0.37***	-0.44***	-0.46***	0.16***
Watch TV							-1.02***	-0.67***	0.27***
Respondent currently working	-1.25***	-0.75***	0.78***	-0.29	-0.20*	0.45***	-0.22	-0.14	0.19***
Age difference between spouses				0.06	0.06***	0.00	-0.04	-0.00	-0.02**
Decision maker for contraception							-0.02	-0.02	0.05***
Decides how to spend money				0.01	0.24***	0.37***			
Final say items	-0.65*** -0.73*** -0.60*** -0.94*** -0.91*** -0.80*** -1.03***	-0.51*** -0.48*** -0.49*** -0.50*** -0.55*** -0.51*** -0.62***	- 0.46*** 0.55*** 0.39*** 0.27*** 0.45*** 0.41*** 0.44***				-0.06* -0.06* -0.08** -0.08***	-0.02 -0.03* -0.03 -0.04**	0.02** 0.04*** 0.03*** 0.03***

	1988			1995			2005		
	Poor	Fair	VG	Poor	Fair	VG	Poor	Fair	VG
Reasons for wife-beating				-0.84***	-0.46***	0.33***			
				-0.58***	-0.26***	0.26***			
				-0.59**	-0.08	0.19**			
				-0.58**	-0.46***	0.56***			
				-0.56***	-0.07	0.64***			
				-0.56*	-0.11	0.59***			
				-0.03	0.11	0.11			
Mobility items				-0.44	0.22*	0.21**			
				-0.41*	0.51***	0.23**			
				0.10	0.68***	0.04			
				-0.26	0.14*	0.16**			
				0.36	0.90***	-0.61***			
				-0.39*	-0.24***	0.11			
Circumcised				-18.80	-0.61*	0.20	0.07***	0.02***	0.01
Intends to circumcise daughters				-0.41	-0.42*	0.25*	0.02	0.01	0.03***
Beliefs on circumcision				-0.52	-0.26*	0.59***	-0.04	0.01	0.04***
				-0.47	-0.26*	0.37***	-0.02	0.01	0.01**
				-0.51	-0.33**	0.09	0.01	0.01	0.00
				-0.01	0.09	-0.42***	-0.01	-0.01	-
				-0.25	-0.15*	-0.09	-0.01*	0.01	0.03***
				-0.55**	0.21***	-0.22***	-0.00	0.02	-0.01**
				-0.12	0.03	-0.09	-0.00	-0.01	0.04***
				-0.41*	0.23**	-0.28***	0.07**	0.01	-
				0.08	0.42***	0.11	-0.00	-0.01	0.04***
				0.15	0.24***	0.29***	0.01	-0.02**	0.07***
				-0.15	-0.03	-0.01	-0.01	-0.01	-0.00
				-0.23	0.12	0.00	-0.01	-0.01	0.01
				0.19	0.48***	-0.09	-0.00	0.00	0.03***
				-0.07	0.28***	-0.01	0.01	-0.00	0.02***
				-0.04	-0.29***	0.23**			0.00
				-0.55***	-0.28***	0.58***			0.05***

 ***p< 0.01 **p<0.05 p<*0.1, VG = Very Good

The final measure of reliability looked at the effect of the presence of other people during the interview process (Table 8). In the 2005 EDHS, the interviewer recorded whether children, the husband, other males or other females were present during the interview and whether they were listening. As with the cooperation variable, I used the previously specified multilevel model, including interviewer effects as random. In this case, I included the presence of children, husband, other males and other females and whether they are listening or not as dummy predictor variables. As with the previous analysis, this analysis cannot say anything about the direction of the effect – it is likely having people present during the interview will

influence the responses, but it is also possible less autonomous women are more likely to have people present during the interview. However, if the effect of people listening on responses to more subjective questions is greater than on more objective ones, it would suggest people listening is causing the difference in responses.

The presence of children has little effect on the responses other than respondents being less likely to report an intention to circumcise daughters if children are listening. Respondents with listening husbands present are less educated, less likely to be literate and less likely to be a blood relative of their husbands. Looking at the subjective questions, the effect is either not significant or smaller in magnitude. The effect of other males has no identifiable pattern. The greatest effect is that of other females listening, with significantly reduced autonomy for respondents. With the exception of the relationship to the household head (presumably, women in extended households are more likely to have women around), the subjective responses tended to be greater than the effect on less subjective responses. For example, the coefficient for education was -0.19 whereas the coefficient for deciding how to spend money was -0.44. This would indicate extra consideration is required for subjective responses when other females are listening since the validity is questionable.

Table 8: Coefficients of presence of people during interview, random effects regression analysis, EDHS 2005

	Children		Husband		Other males		Other females	
	Listening	NL	Listening	NL	Listening	NL	Listening	NL
Age at first marriage	0.00	0.12	0.06	0.10	-0.40***	-0.24*	-0.20***	-0.04
Relationship to husband	0.02	0.09	0.09	0.34***	-0.10	-0.25*	-0.14*	-0.14
Relationship to household head	0.01	0.12	0.82***	0.61***	-0.05	-0.53***	-0.54***	-1.3
Age at first birth	-0.06	0.01	0.08	0.06	-0.35**	-0.14	-0.12	-0.06
Education	-0.07	0.17**	-0.43***	-0.03	-0.44***	-0.40***	-0.19**	-0.02
Literacy	-0.08	0.11	-0.49***	-0.28	-0.45***	-0.33**	-0.19**	0.01
Read newspaper	0.05	0.05	-0.21	0.21	-0.40	-0.39*	-0.48***	-0.23

	Children		Husband		Other males		Other females	
	Listening	NL	Listening	NL	Listening	NL	Listening	NL
Listen to radio	-0.16*	-0.09	-0.05	0.25**	0.11	0.07	-0.02	-0.20*
Watch TV	-0.30*	-0.02	0.17	0.50*	-0.25	0.13	-0.07	0.016
Respondent currently working	-0.13	-0.11	0.17	0.38***	0.27	-0.18	-0.30***	-0.10
Age difference between spouses	0.05	-0.04	-0.23	-0.04	0.10	-0.10	-0.01	0.04
Decision maker for contraception	-0.28***	-0.18***	-0.20	-0.10	-0.00	0.09	0.14*	0.015
Decides how to spend money	-0.09	-0.04	-0.07	0.37**	0.25	-0.22	-0.44***	-0.10
Decides how to spend husband's money	-0.09	-0.17*	0.17	-0.20	-.12	-0.35**	-0.43***	0.09
Final say items	-0.15	-0.07	-0.52***	0.05	-0.17	0.04	-0.47***	0.03
	-0.17**	0.03	-0.07	0.16	-0.14	0.05	-0.25***	0.08
	-0.03	0.07	-0.26	-0.04	0.32*	-0.20	-0.57***	-0.06
	-0.16	0.09	-0.25	0.02	-0.03	-0.03	-0.54***	0.02
Wife beating	-0.09	0.03	-0.28*	0.14	-0.17	-0.16	-0.32***	-0.12
	-0.16*	0.00	-0.15	0.07	-0.20	-0.11	-0.30***	-0.04
	-0.15*	0.12	-0.18	-0.01	-0.09	-0.27**	-0.27***	-0.00
	-0.20**	0.05	-0.07	0.01	-0.12	-0.14	-0.33***	-0.15
	-0.01	0.17*	0.07	0.07	-0.09	-0.18	-0.24***	-0.23*
Circumcised	0.21	0.06	-0.15	-0.32	0.20	-0.60	-0.22	-0.31
Intends to circumcise daughters	0.41***	0.07	-0.37	-0.07	-0.15	-0.17	-0.36**	-0.16
Beliefs on circumcision	0.07	-0.10	-0.13	0.03	-0.05	-0.12	-0.21*	-0.02
	0.09	-0.19*	-0.19	0.02	-0.13	-0.07	-0.33***	-0.07
	-0.23*	-0.26**	-0.36	-0.02	-0.01	-0.06	-0.26**	-0.04
	0.22**	0.02	-0.39**	-0.16	0.02	-0.15	-0.18*	-0.04
	0.11	0.02	-0.07	0.34***	-0.16	0.18	-0.33***	0.10
	0.06	-0.04	-0.03	0.16	0.19	0.30**	-0.01	0.16
Experience of domestic violence	0.00	-0.10	-0.13	0.02	0.17	0.10	-0.01	-0.02
	-0.01	-0.03	-0.08	0.04	0.07	-0.09	-0.03	-0.01
	-0.03	-0.08	-0.12	-0.05	0.10	-0.11	-0.02	-0.02

***$p < 0.01$ **$p < 0.05$ *$p < 0.1$

DISCUSSION AND CONCLUSION

The analyses conducted here raise some concerns about both the reliability and validity of indicators of female autonomy. In the first instance, female autonomy is a concept that does not translate well over contexts, including temporal, placing the validity of measurements of empowerment in question. Secondly, interviewer effects and the effect of the presence of other people, in particular listening females, threaten both the validity and reliability of the measures and require special measures to handle their effects.

Using a standard battery of questions, with some changes between surveys, I showed the dimensionality of autonomy does not remain constant over time, even when examining each dimension separately. This indicates either the validity of the measures is changing or the concept itself is changing over time. It is likely both scenarios are true. For example, female circumcision in Egypt, one of the variables used to capture autonomy, is gradually becoming less acceptable. While the EDHS do not provide evidence of a decline in circumcision, this is likely because the sample is restricted to ever-married women; other data point to a decline in the prevalence of circumcision (El-Gibaly et al. 2002). Therefore, the effect of circumcision and beliefs on circumcision is changing. The young women included in the EDHS, particularly the youngest women, are also becoming a more select group as the age of marriage increases in Egypt. In 2003, only ten percent of Egyptian women aged 15-19 were married, down from 22 percent in 1972 (Rashad et al. 2005). Broad social change, such as has occurred in Egypt, means that women in the sampling frame are not the same across time, the underlying concept of autonomy is changing and the measures used to capture autonomy are also influenced by the temporal change. Taken together, it is questionable whether there is any value in determining one index of autonomy that can be used from one survey to the next. Where there is a need to compare changes in autonomy, the most appropriate method is to create survey-specific indices, although this does lead to less elegant comparisons and a loss of comparability.

There are also worrying interviewer-related effects. It is clear interviewers are biasing results to a degree above that acceptable but it is difficult to quantify the effect and its direction. Interviewers appear to be under-estimating the autonomy of women classified as uncooperative and overestimating the autonomy of women classified as more cooperative. The bias in the more subjective responses is too large to be ignored when analyzing data with

female autonomy items. As a result, I would recommend interviewers be included as a random effect. Assuming each interviewer has a consistent bias, this would account for a large part of the interviewer effect.

Finally, particular attention needs to be paid to responses where other women are listening. The data suggest the presence of other listening women leads women to decrease their autonomy, even after taking into account the fact respondents with listening women tend to be less autonomous. In the Arab world, gossip and reputation are important vehicles of social control, in particular for women for whom religious and social norms are more strictly enforced (Abu Baker 2003). Including a dummy variable for the presence of other listening women should account for much of the effect, controlling for other sociodemographic and autonomy variables.

One limitation of this work is that it is survey specific – a fact highlighted by some of my findings. Measures of autonomy from other surveys or other contexts may find different dimensions and a different magnitude of biases. Indeed, it is optimistic to see the interviewer effect is decreasing over time – an indication interviewers are better trained in interviewing techniques. However, despite the specific context of a survey, it is prudent for any researcher to pay attention to the dimensionality of women's autonomy and any biases the survey methodology may introduce.

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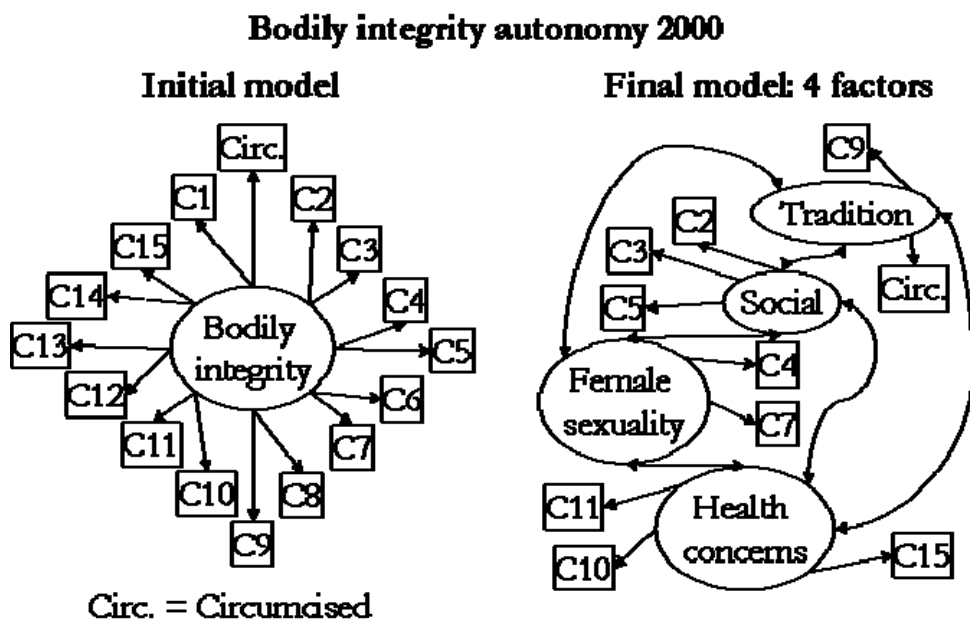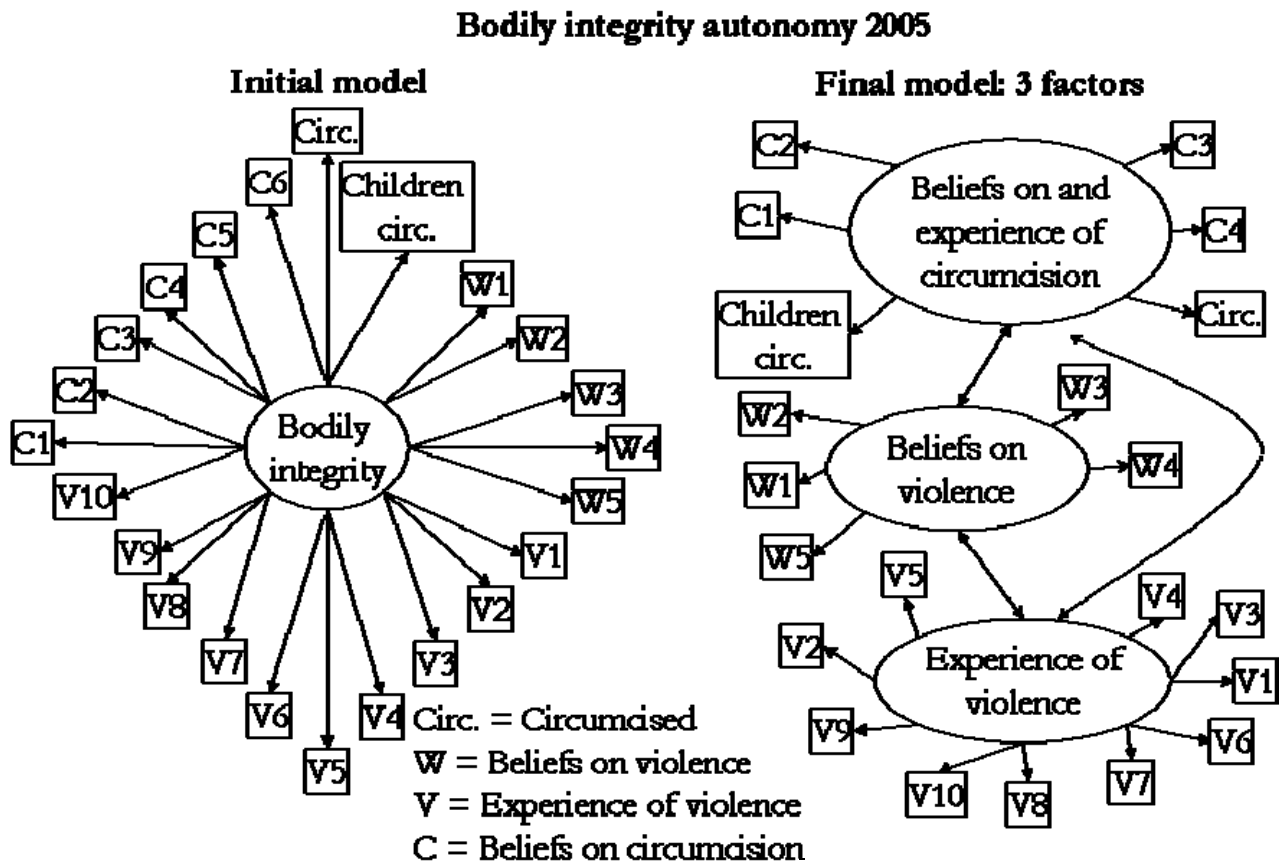
Appendix

Table A1: Variables used in the CFA models

	1992	1995	2000	2005
C1		Circumcision should continue	Circumcision should continue	Circumcision should continue
			Advantages of FGM:	
C2		Circumcision lessens sexual satisfaction	- social acceptance	Thinks that men want circumcision to continue
C3		Husbands prefer circumcised women	- better marriage	Husband prefer wife to be circumcised
C4		Circumcision prevents adultery	- preserves virginity	Circumcision prevents adultery
C5		Circumcision makes childbirth more difficult	- increase man's pleasure	Circumcision makes childbirth more difficult
C6		Circumcision can cause girl's death	- religious approval	Circumcision can lead to girl's death
C7		Circumcision part of religious tradition	- reduces sexual desire	
C8		Circumcision causes fertility problems	- traditions	
C9			- better hygiene	
			Benefits no FGM:	
C10			- fewer medical problems	
C11			- avoid pain	
C12			- more female sexual pleasure	
C13			- more pleasure for the man	
C14			- follows religion	
C15			Believes men want FGC to continue	
		W: Husband justified beating if wife…		
W1		- burns food		- burns food
W2		- neglects children		- neglects children
W3		- answers back		- argues with him
W4		- talks to men		- goes out without telling him
W5		- wastes money		- wastes money
W6		- refuses sex		- refuses sex
V1		How frequently hurt.		Spouse ever humiliated her
V2				Spouse ever threatened her with harm
V3				Ever emotional violence
V4				Spouse ever pushed,

	1992	1995	2000	2005
				shook or threw something
V5				Spouse ever slapped or twisted her arm
V6				Spouse ever punched
V7				Spouse ever kicked or dragged
V8				Experienced less severe violence
V9				Experienced severe violence
V10				Experienced sexual violence
FS: Final say on…				
FS1	- own health care	- medical care	- own health care	- own healthcare
FS2	- large household purchases	- budget	- large household purchases	- large household purchases
FS3	- day to day household purchases	- having child	- day to day household purchases	- day to day household purchases
FS4	- visits to family	- visits to family	- visits to family	- visits to family
FS5	- food to be cooked	- food to be cooked	- food to be cooked	
FS6		- child's marriage		
FS7		- child's education		
FS8		- contraception		
M1		Can go outside home		
M2		Can go to market		
M3		Can go to health unit		
M4		Can go on picnic		
M5		Can go to visit friends/family		

Table A2: Definitions of autonomy for interviewer and presence of other people effect

Indicator	Measure of autonomy
Age at first marriage	> 17
Relationship to husband	Not related
Relationship to household head	Nuclear/maternal family
Age at first birth	>20
Education	> primary
Literacy	Literate
Read newspaper	Reads
Listen to radio	Listens
Watch TV	Watches
Respondent currently working	Works
Age difference between spouses	< 6
Decision maker for contraception	Yes
Decides how to spend money	Yes
Final say items	Yes
Reasons for wife-beating	Doesn't agree
Experience of violence	Has not experienced
Mobility items	Mobile
Circumcised	Not circumcised
Intends to circumcise daughters	Does not intend
Beliefs on circumcision	Does not believe

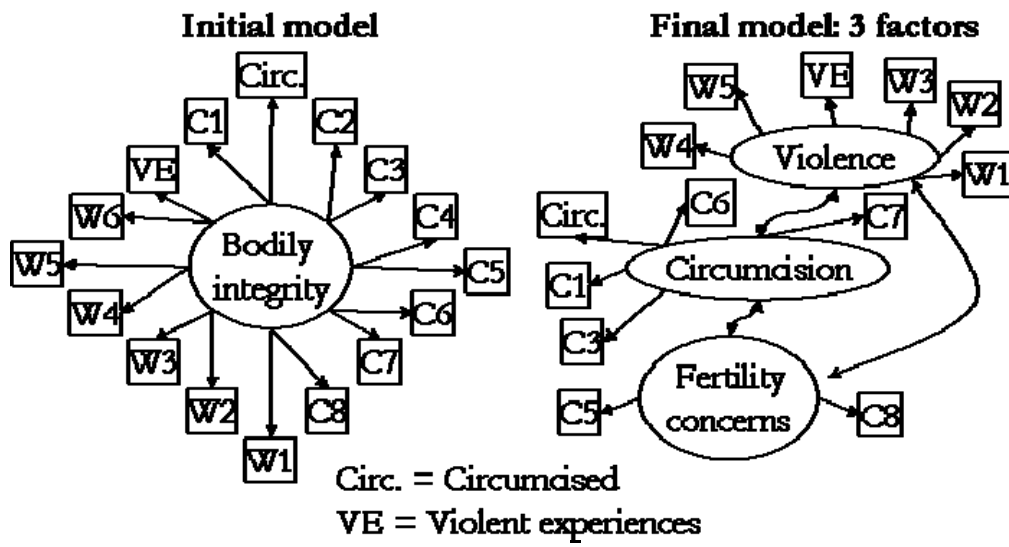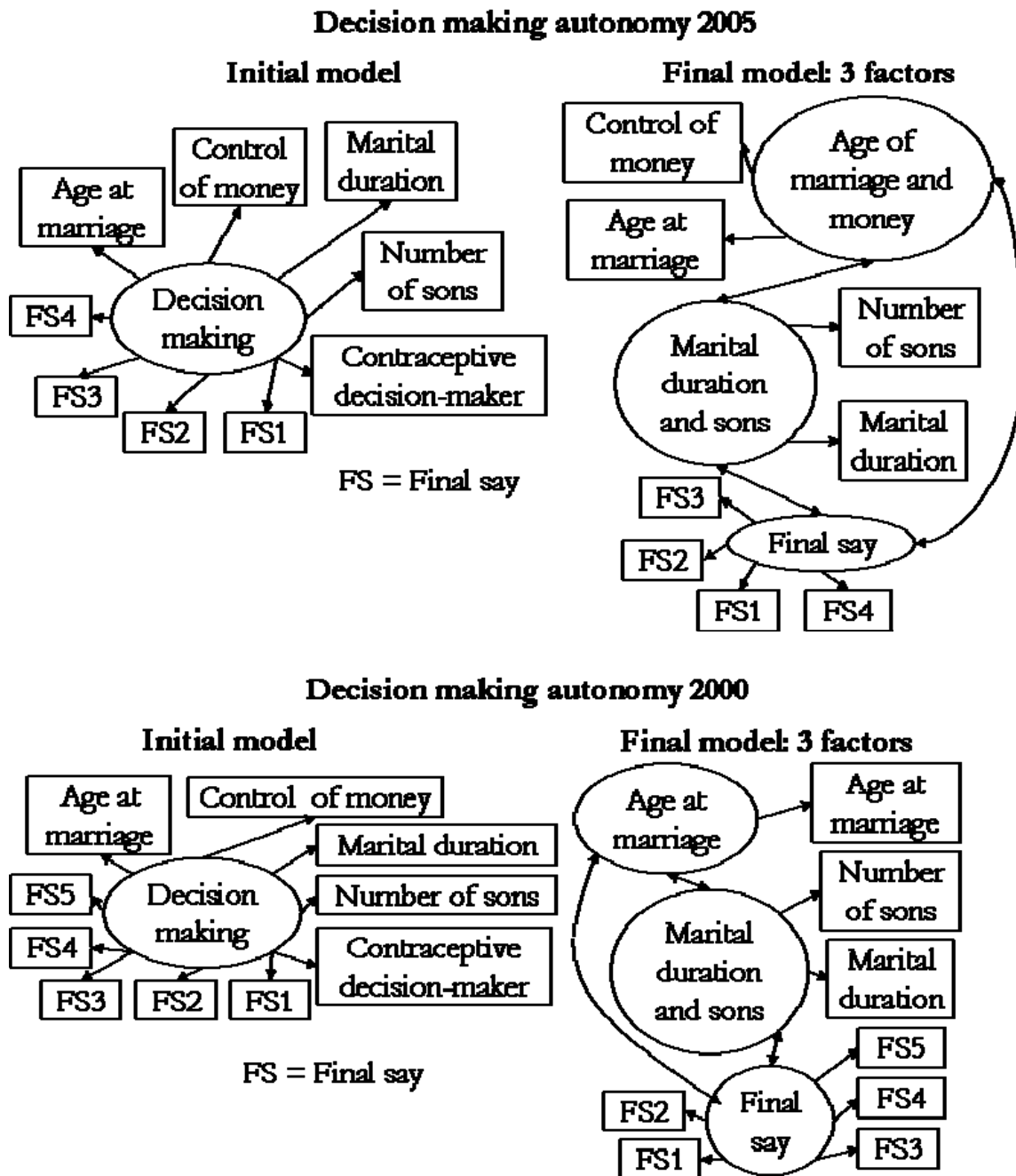**Figure A1: Models of bodily integrity autonomy**

Bodily integrity autonomy 2005

Initial model

Circ. = Circumcised
W = Beliefs on violence
V = Experience of violence
C = Beliefs on circumcision

Final model: 3 factors

Bodily integrity autonomy 2000

Initial model

Circ. = Circumcised

Final model: 4 factors

Bodily integrity autonomy 1995

Initial model

Final model: 3 factors

Circ. = Circumcised
VE = Violent experiences

Figure A2: Models of decision making autonomy

Decision making autonomy 2005

Initial model

Final model: 3 factors

FS = Final say

Decision making autonomy 2000

Initial model

Final model: 3 factors

FS = Final say

Decision making autonomy 1995

Initial model

Final model: 4 factors

FS = Final say

Decision making autonomy 1992

Initial model

Final model: 2 factors

FS = Final say
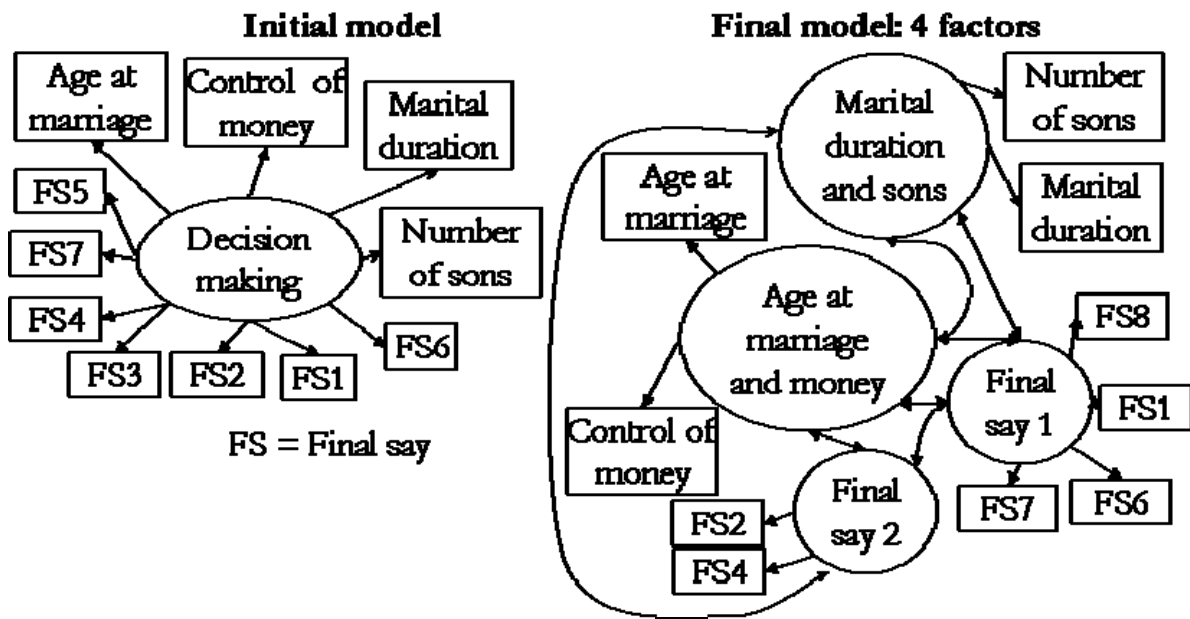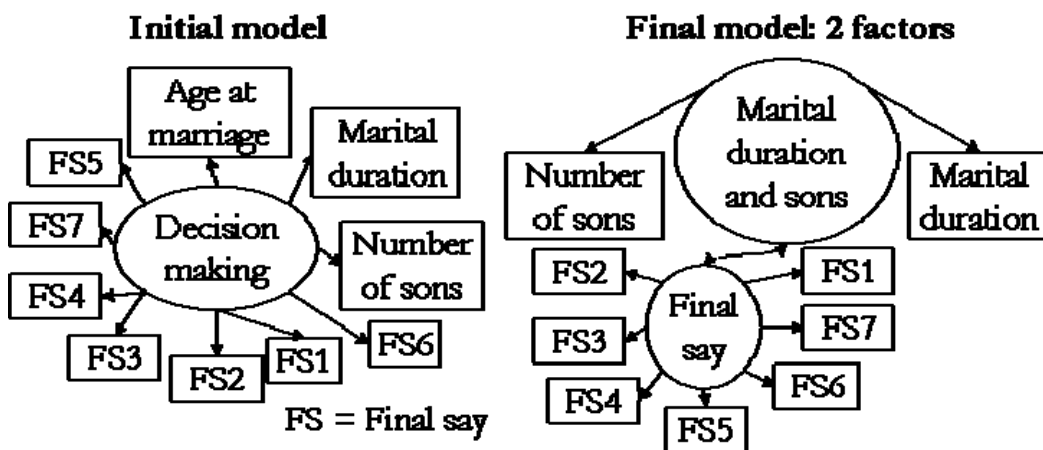
Figure A3: Models of knowledge autonomy

Knowledge autonomy 2005

Initial model   Final model: 1 factor

Knowledge autonomy 2000

Initial model   Final model: 2 factors

Knowledge autonomy 1995

Initial model   Final model: 2 factors

Knowledge autonomy 1992

Initial model   Final model: 1 factor
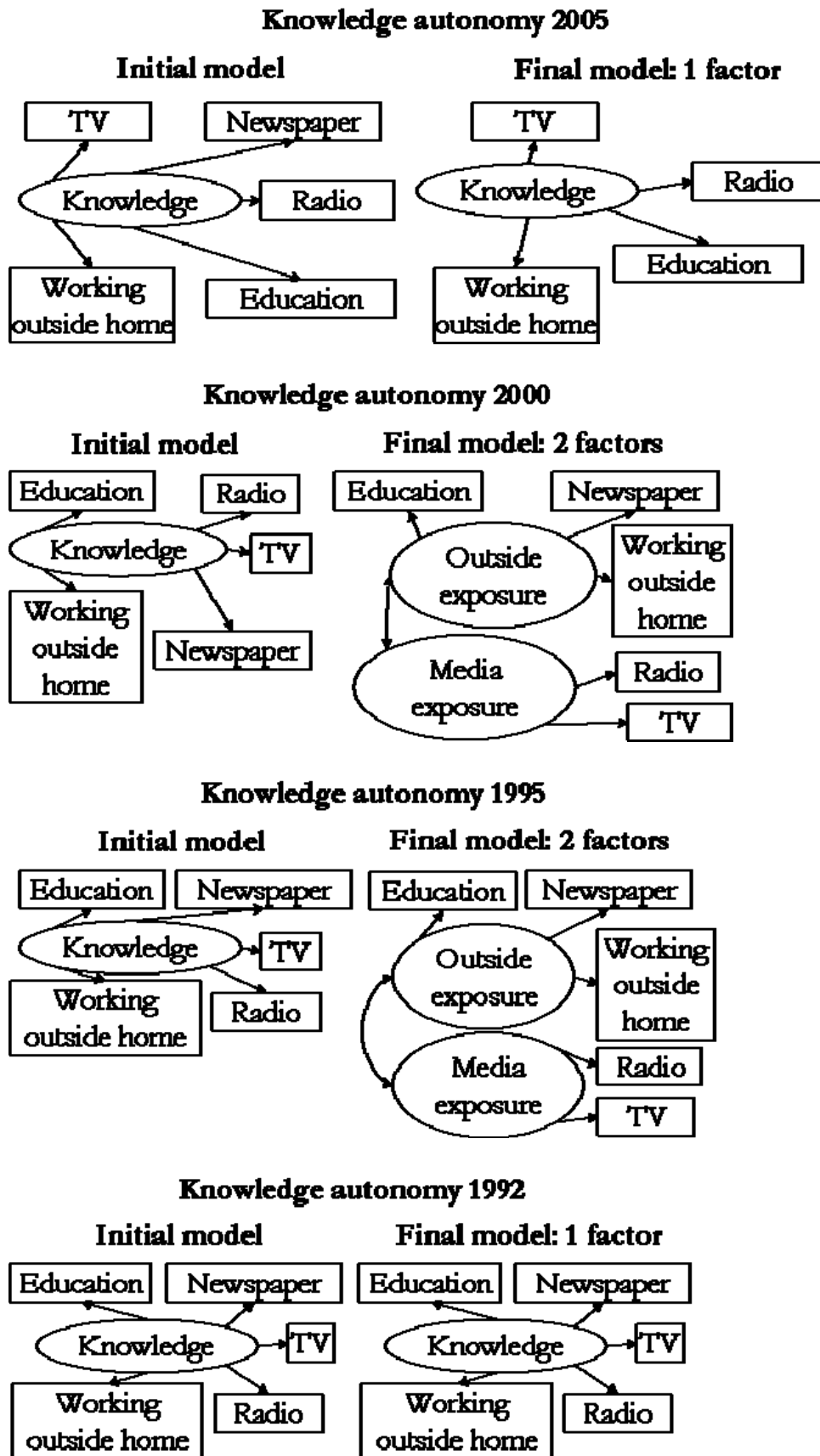
Figure A4: Models of socioeconomic autonomy

Socioeconomic autonomy 2005

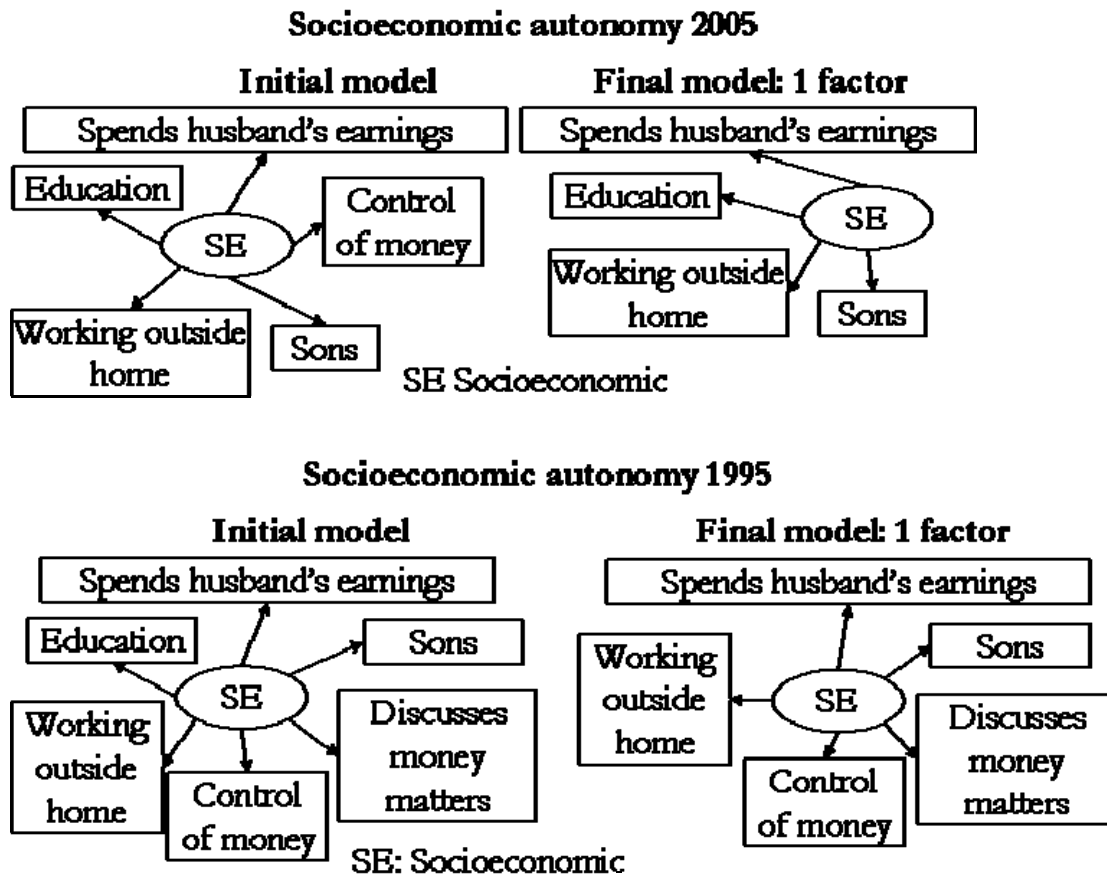SE Socioeconomic

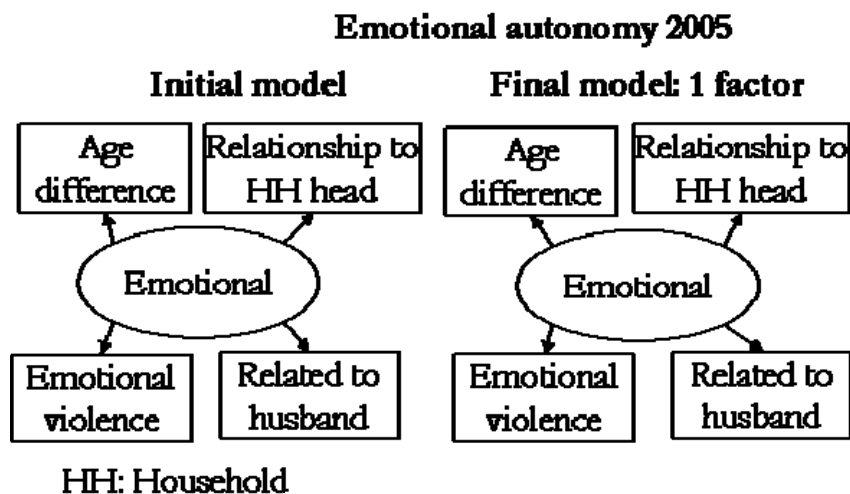## Socioeconomic autonomy 1995
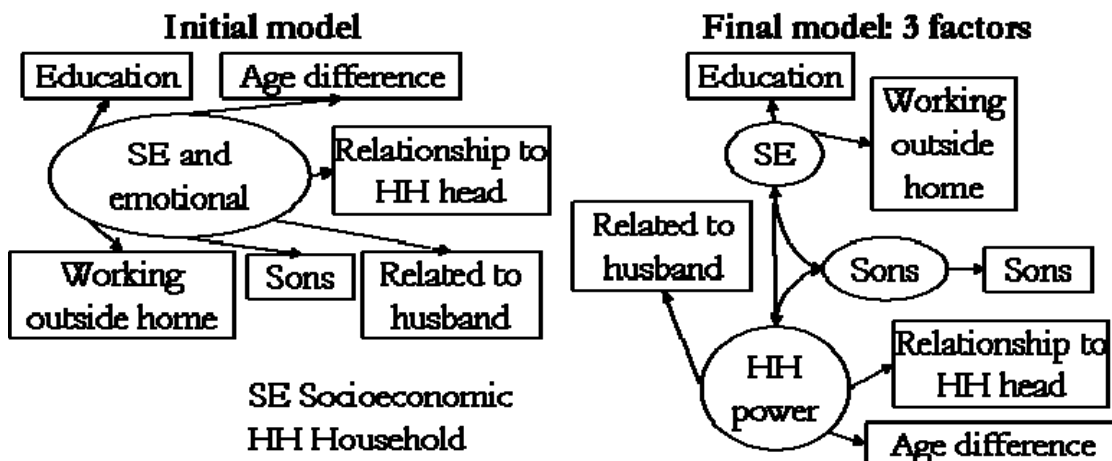

SE: Socioeconomic

Chart 4.5: Models of emotional autonomy

Emotional autonomy 2005

HH: Household

Emotional autonomy 1995

Initial model

Age difference | Relationship to HH head
Emotional → Eat together
Knew husband | Related to husband

Final model: 1 factor

Age difference | Relationship to HH head
Emotional → Eat together
Knew husband | Related to husband
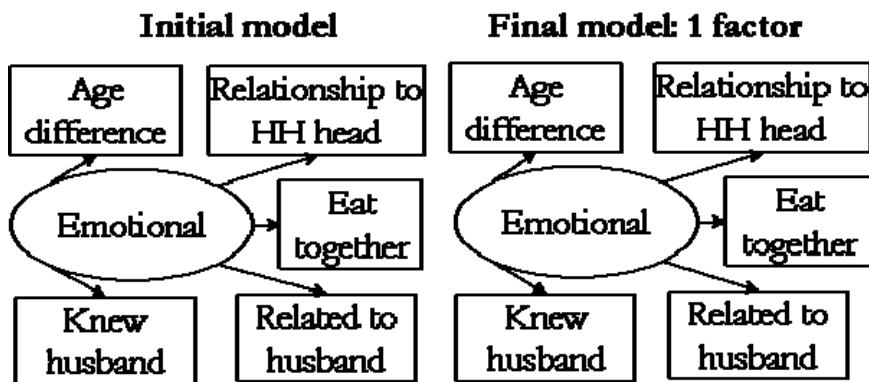
HH: Household

Figure A6: Models of socioeconomic and emotional autonomy

Socioeconomic and emotional autonomy 2000

Initial model

Education | Age difference
SE and emotional → Relationship to HH head
Working outside home | Sons | Related to husband

SE Socioeconomic
HH Household

Final model: 3 factors

Education
SE → Working outside home
Related to husband
Sons → Sons
HH power → Relationship to HH head
Age difference

Socioeconomic and emotional autonomy 1992

Initial model

Age difference | Relationship to HH head
Education
SE and emotional → Control of money
Working outside home | Sons | Related to husband

SE Socioeconomic
HH Household

Final model: 2 factors

Education | Working outside home
SE → Control of money
Related to husband
HH power
Relationship to HH head | Sons

Figure A7: Models of physical autonomy

Physical autonomy 1995