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Vulnerable Daughters in Times of Change:
A Set-Theoretic Analysis of the 'Missing Girls' Problem in India

MATTIAS LARSEN
mattias.larsen@globalstudies.gu.se
Peace and development research
School of Global Studies
Gothenburg University

Abstract: In India, girls are aborted on a massive scale merely because they are girls. Underlying this widespread problem is the puzzling fact that the problem exists simultaneously with India experiencing remarkable development and change. Daughters have become vulnerable or even seen as dispensable in a time of general improvement in welfare and female status, and deep economic and social changes. The central argument of this article is that paying specific attention to this counterintuitive contradiction is key to explaining the problem. The findings centre on the most prominent theme in people's accounts; a contradiction between the continued importance of the cultural factors which for so long have established that a son is necessary in ways that a daughter cannot be and socio-economic changes that are challenging the foundations for these very same factors. The uncertainty over sons fulfilling expectations that this contradiction entails, rather than tilt the balance in favour of daughters within the context of a small family and lack of alternative arrangements for social support, has instead *increased the relative importance of sons* and intensified negative consequences for daughters. The article applies a set theoretic systematic comparison of eight villages incorporating both qualitative and quantitative data. The use of fuzzy sets facilitates a critical and alternative analysis based on a reconceptualisation grounded in intensive fieldwork which captures an important contextual nature of the problem. Two separate paths constituting contexts in which it becomes tragically rational to exclude daughters are found to lead to the problem.

BACKGROUND[1]

Underlying the widespread problem of millions of 'missing girls' in India as a result of sex selective abortions is the puzzling fact that the problem exists simultaneously with India experiencing remarkable development and change[2]. Daughters have become vulnerable or even seen as dispensable in a time of general improvement in welfare and female status, and deep economic and social changes. The central argument of this article is that paying specific attention to this counterintuitive contradiction is key to explaining the problem.

The findings centre on the most prominent theme in people's accounts; a contradiction between the continued importance of the cultural factors which for so long have established that a son is necessary in ways that a daughter cannot be and socio-economic changes that are challenging the foundations for these very same factors. The uncertainty over sons fulfilling expectations that this contradiction entails, rather than tilt the balance in favour of daughters within the context of a small family and lack of alternative arrangements for social support, has instead *increased the relative importance of sons* and intensified negative consequences for daughters.

Data and methodology

The paper uses a methodological approach geared toward reconstructing contexts of meaning for the purpose of understanding why people act as they do (Weber, 1978, Ekström, 1992, Eliaesson, 1992). This approach is new in the context of research on this problem and is based on the critique that not enough insights from interpretive work have been incorporated into studies intent on causal analysis. Through the use of fuzzy set QCA (Ragin, 2000, 2008), an empirical exploration and reconceptualisation of the explanatory conditions based on grounded and systematic comparisons is possible. Fuzzy sets allow the incorporation of both qualitative and quantitative data in the same formal conceptualisation of a phenomenon and are particularly valuable because they can be infused with theoretical and substantive knowledge. The procedure has three

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[1] This paper is based on work done for my PhD dissertation (Larsen, 2009). I want to thank Neelambar Hatti, Ravinder Kaur, Leif Eriksson, Sanjeev Rana and everybody who contributed during fieldwork.

[2] One "conservative" estimate is that some 10 million female foetuses have been aborted during the past two decades simply because they were girls (Jha et al, 2006).

main steps of which the first was the qualitative fieldwork, followed by analysis aimed at finding out as much as possible about each case. Through cross-case comparisons the understanding of each case and the explanatory conditions was refined and systematized. This process culminated in the creation of a truth table and fuzzy set QCA analysis. The third step was to convey the results from the analytic moment back to the cases in which the results were *interpreted*, compared and judged on how useful they are in enhancing understanding of the cases and of the different solutions that have to make sense on a case level (Adcock & Collier, 2001).

When the 2001 Census data was published it became clear that the state of Himachal Pradesh had become the state with the fifth lowest child sex ratios (CSR)[3] in India. This study compares eight villages in the districts Kangra, Una and Kullu – of which the former two experienced serious declines from a normal level in 1991 – five of which had very low child sex ratios and three of which had no problem with 'missing girls'. Data was collected during six months of fieldwork carried out in two periods between September 2006 and June 2007 consisting of 55 semi-structured interviews, 8 focus group discussions and a survey of 477 households.

Insert table 1 here

The article is divided into four additional sections starting with a presentation of the four explanatory conditions – a section itself divided into two parts – and the outcome. The subsequent section describes the translation of raw data into fuzzy sets and is followed by a section that presents the results of the fuzzy set analyses. A final section presents interpretation and discussion of the substantive content of the findings.

CONCEPTS, MEASUREMENTS AND EXPLANATORY CONDITIONS

The analysis considers four explanatory conditions found to be central. However, one of them is a cultural factor that is exogenous to the village and has a more remote effect that makes it distinctly different from the other three. In terms of the remaining three conditions – all related to changes – respondents see themselves or at least other people

[3] The child sex ratio is the number of girls per 1000 boys in a population.

in their village, as directly part of them. This makes a strong case for dividing analysis into two steps and is the reason why son necessity is analysed separately (Schneider & Wagemann, 2006, Goertz & Mahoney, 2006).

The cultural role of the son – a necessary condition

There is a distinct *qualitative* difference between a preference for sons over daughters, as the role of the son has conventionally been conceptionalised, and how respondents discuss the fact that it is imperative to have "at least one son"[4]. For this reason it therefore makes sense to talk about *son necessity* instead of *son preference*.

The way in which respondents reasoned about sons were reflected in the six different reasons they gave for why there is a perceived need to have a son in their village. These were included in the questionnaire and their ranking is shown in table 2 below. Columns show the 1st ranked to the 6th ranked reasons where the highlighted area denotes the particular reason which is specified in the rows. Thus, 'for old age support' was ranked as the most important reason by 57% of the respondents.

Insert table 2 here.

Somewhat surprisingly, with only minor variation, *practically the same ranking pattern was found in all villages and religious and income groups.* The pattern for the three most important reasons only had one exception whereas the ranking for the two least important reasons varied between villages.

The reasonings reflect a structure of conditions constituting a patrilineal culture, the two main features of which are virilocal marriage and village exogamy, i.e. the prescription to arrange marriages in which the couple resides with the husband's household and that spouses are sought from outside one's own village (Sharma, 1980). These are in turn related to the two basic organizing features of rural life in this part of India; caste endogamy and *Gotra* (clan) exogamy. Marriages are arranged between couples from the same caste, or rather *Jati*[5], but from a different clan. As a result of exogamy the lineage

[4] This has been found to be a crucial underlying desire in several studies. See for example Hull (1990), Johansson & Nygren (1991), Coale & Banister (1994), Mutharayappa et al (1997), Das Gupta et al (2003) and Chung & Das Gupta (2007).

[5] The idea of community, or *Jati*, is related to Hindu religious beliefs in that all members of one community are said to be descendants of the same *Rshi*, thereby constituting one *Gotra*. *Gotra*

is reproduced through men and continuity of the social order is perpetuated solely through males. Women are thus assigned a transitory position in the social order (Sharma, 1980, Das Gupta et al, 2003).

One of the major contributions with regard to daughter discrimination and the 'missing girls' problem in India was Das Gupta's (1987) finding that discrimination against daughters is greater in higher birth order parities. However, the preferences reported in this study showed *very little variation in degree of son preference*. In fact, the overwhelming majority – between 90 and 100 percent – prefer to have an equal number of sons and daughters[6], with only a minor bias toward son preference among those who gave answers other than 'equal number'. This also does not change significantly when controlling for the actual sex composition of respondents' families across the eight villages. The strong regularities indicate a more general pattern; indeed, that *son preference is a distinctly cultural dimension*. It varies neither with social or economic indicators such as income or caste, nor with geographic indicators such as district nor with religion. The same applies for the ranking patterns.

While respondents iterate a gender preference norm of one son and one daughter, what they actually have is – put in blunt average numbers – *less than one daughter and necessarily one son*. Fully 29.8 per cent of the 477 households included in the survey had only one child, 67.6 per cent of which had only a son. The average number of children per respondent (mother) was 2 with the lowest average being 1.4 for the village of Gojra and the highest 2.4 for the village of Kasba. The low figure for Gojra is related to the fact that "people stop having children if their first child is a boy" (Int/Gojra/M/10)[7]. In other words, they fulfil their need to have "at least one son" and stop.

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is the lineage, or clan, of the so-called twice-born Hindus of *Brahmin*, *Kshatriya* and *Vaisya* descent at birth. These three categories together with the *Shudra* make up the four *Varnas* of Hindu Cosmology of which the *Shudra* are not considered twice born. Each *Jati,* or caste is part of one particular *Varna*. Thus, the *Thakurs* (*Jati*) of Kullu are *Kshatriya* (*Varna*). *Rshi* refers to the sages who authored the Rigveda, the oldest of the Vedas, the holy scriptures of Hinduism.

[6] The figures for son preference were calculated as the ideal number of sons reported relative to the ideal number of children. Arnold (1992) found that the ideal number of sons and daughters reported have tended toward a balanced sex composition at every parity in most parts of the world.

[7] The coding keys are used to identify interviews carried out with anonymous respondents and each has four parts separated by a / sign. The first indicates whether it is a reference to an

Daughters, on the other hand, are perceived in terms of being liabilities. Because of this the real quantitative difference is more discernible in the fact that as many as 37.3% of all households had no daughter at all. As expected the tendency is that the fewer the children in a family, the larger the proportion of sons[8], something which is visible in the negative correlation between the two (-.274, Spearman's Rho, sig. 0.01). This relationship varied in strength between the three districts, being stronger in Kullu district (-.493, Spearman's Rho, sig. 0.01) than in Kangra district (-.346, Spearman's Rho, sig. 0.01) which in turn was stronger than in Una district (-.144, Spearman's Rho, sig. 0.01). In Gojra, the correlation is -.528 (Spearman's Rho, sig. 0.01), whereas there is no significant relationship in Kasba Narwana.

As Das Gupta et al (2003) so perceptively pointed out; a change to having two instead of three sons is a far easier shift than from having one son to having no son at all. Clearly, there is a qualitative difference of central importance between the two. It is the interplay of the culture of son necessity and small family sizes that produce the quantitative effect rather than a preference for more sons.

A very important finding is therefore that *son necessity is a necessary condition*. After all, the cultural schema centred on a perceived need to have a son has been found to be a precondition for the problem of low child sex ratios time and again. It is an important factor in all villages with a problem of low CSR. In fact, it is an important factor in seven of the eight villages, the only exception being Kasba Narwana which also does not have a problem with low CSR[9]. Moreover, since son necessity exists in seven of the eight villages, and thus also in villages without a problem of low CSR, it can also be concluded that *son necessity is not a sufficient condition* to result in a low CSR. Shifting the focus to son necessity showed this asymmetric (i.e. non-linear) relationship between

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interview (Int) or a focus group discussion (FGD). The second gives the village name, the third whether a woman (F), a man (M), or both (B) were interviewed. The last part is the number given to each interview and focus group discussion.

[8] The proportion of sons was calculated relative to the total number of children in the family and not to the number of daughters as is the case when calculating sex ratios, i.e. it was calculated as a fraction and not a ratio. This was necessary in order to minimize divisions with zero for households with either no son or no daughter. Calculating child sex ratios for households is inherently problematic for this reason; the unit of analysis is too small.

[9] The proportion of respondents in Kasba Narwana who reported it necessary to have at least one son was only 19.6 per cent. All other villages had a majority of respondents ascribing to this necessity.

culturally prescribed gender ideals for family composition and CSR. This also shows that son necessity is not merely reducible to cultural determinism. However, if this cultural pattern is central then why is the problem rampant now when the cultural features are obviously centuries old? Furthermore, why is the problem not present in certain villages even though such a cultural feature is prominent there as well?

Decline in trust in sons

Based on the importance attached to having a son, it is startling to find that *parents distrust their sons to take care of them in their old age in all eight villages*, the most important reason they reported as to why it is felt necessary to have a son. This is illustrated in table 3. Looking at the overall figures for all villages in the first row it is clear that while 65.1 per cent agreed that they trusted their son to take care of them in their old age at the time they got married, and only 12 per cent disagreed (22.9 per cent gave a neutral answer), fully 60.9 per cent disagreed at the time of the survey while only 9.8 per cent agreed (29.3 per cent gave a neutral answer).

Insert table 3 here.

It is thus very clear that *something fundamental has changed in the relationship between parents and their sons*. These figures should be interpreted as expressions of the main contradiction between the still so important and structural role played by the necessity to have a son and the many contextual changes that challenge it. The causal implication of a necessary but insufficient condition is that it plays a role in combination with other factors and the second part of the analysis therefore concerns the three conditions of change.

Very low child sex ratios – the outcome set

The outcome to explain is fairly straightforward from a conceptual point of view. We want to explain why the child sex ratio is *unnaturally low*. The so called *natural sex ratio at birth* can be used as a yardstick for determining what is natural. This therefore corresponds to a central feature of fuzzy sets and will be used to define the so-called *crossover point*. The natural sex ratio at birth is considered to range between 935 and

971 girls to 1000 boys (Chahnazarian, 1988, United Nations Secretariat, 1998, Arnold et al, 2002) with an average *natural sex ratio at birth of 953 girls to 1000 boys*[10].

Data on the numerical relationship between girls and boys is available from the Census of India's latest census of 2001. A second source came from the records that each medical officer responsible for each village is tasked to keep of each household and their respective members in each village. Together with the survey conducted, three separate sources are thus available which together provide a reliable overview of the actual numerical relationship between girls and boys.

An important criterion when choosing villages – based on the CSRs from the Census data – was *that they have either high or low values*. It was important that these outcome values were distanced from the natural sex ratio at birth of 953 because it ensures that they *differ in kind*, and are qualitatively different in terms of sex ratios. This is central to the comparative analysis which is based on contrasting these with each other. Villages with a low CSR all have a ratio of below 700/1000 and villages with a high CSR all have a ratio of above 1000/1000 (see table 5 below).

The dowry problematic

Dowry entails a transfer of movable resources from the woman's natal family to the woman, her husband or his kin, at the time of her marriage and is essentially a devaluation of women (Agarwal, 1994, Kabeer, 1999). The deeper problems come about when giving a dowry becomes a medium through which status can be attained and when families compete in giving large dowries in a publicly ostentatious manner. It means that richer people give much more. Many respondents also referred to the fact that gaining status in this way is closely related to emphasising Jati – or caste – boundaries since it is as members of a particular community that status is gained (Srinivasan, 2005). Another important indicator is the existence of sanctions for women who have not brought a dowry.

[10] Chahnazarian (1988) suggests the natural ratio to be between 935 and 961 girls to 1000 boys while the United Nations Secretariat (1998) study which Arnold et al (2002) base their figures on suggests a ratio of between 943 and 971. Johansson and Nygren (1991), who analysed 240 years of Swedish data, conclude that the sex ratio at birth is "biologically very stable" and close to 952 females per 1,000 males. They also found that the sex ratio at birth from 12 other western industrialised countries for the period 1970-84 conforms to patterns found in Swedish data.

However, the case studies also showed that it might not simply be the actual level but a substantial increase in it that is problematic. If dowry shapes incentives and structures future action, then it also does so in a context in which it is rapidly increasing in importance as a problem, whether or not there is a high level. This is particularly noteworthy in the two villages in Kullu district where "ten to fifteen years ago dowry was unheard of" (Int/Gojra/M/5), but where dowry is nevertheless a serious problem.

Empowerment

The first aspect discernible as being at the core of the changes women have experienced concerned empowerment on a *personal level*, which was related to education, awareness and changes in the labour situation. Strongly connected to this was the question of the restrictions that women face when trying to exercise this awareness and their rights. These were generally related to *gunghat/purdah*[11] norms restricting, in particular, women's mobility. In fact, a general trend was visible in that in all villages women now face fewer restrictions. Another very important aspect complementing the personal aspect is related to *how empowerment of women affects a village*. This is where the importance of women's circles shone through in how being organized in *Mahila Mandals*[12] enabled women to collectively influence village matters. *Relationships within the household* and how women were able to influence household decisions were also of great importance. This was manifested in how much the wife contributes to the household income. The collective savings schemes – when successful – provide crucial collateral in obtaining loans from formal lending institutions. Accordingly, it is also in the villages with active *Mahila Mandals* that wives contribute more to household income. The increases in women's contributions to their households are of particular

[11] *Gunghat* and *Purdah* norms place a special responsibility on women as carriers of family honour. Family status is maintained if the woman conforms to "certain standards of modest female conduct" including avoidance of male affines and public invisibility of women, and it is damaged by "unwomanly conduct" (Sharma, 1980:3). *Gunghat* is a milder form of *Purdah* which requires covering the head and part of the face with the end of a *dupatta* or *saree* in the presence of strangers. *Purdah* norms are associated with Muslims and *Gunghat* with Hindus (Mandelbaum, 1988).

[12] The term *Mahila Mandal* literally translates into women's circle. These 'women's circles' were first organised during the second five year plan – between 1956 and 1961 – and are groups of women who meet regularly to discuss and help each other with everyday problems. They constitute important support structures that have been central to much of the change in rural Himachal Pradesh.

importance because it is an expression, or indication, of both the collective dimension and to what it has meant for women personally[13].

Change in authority within the family

One of the most important conditions affecting people's lives in the eight villages is the changing role of agriculture. Families in Himachal Pradesh have always supplemented the income derived from farming with various non-farm income sources. With a high proportion of household income from non-farm sources it is no longer a case of *supplementing* agriculture with non-farm income, but rather a *dependence* on non-farm sources of income. Such a change is related to changes within the family in that it makes people increasingly independent of traditions and familial pressures.

In addition to this economic dimension, the data analysis also presented two equally important social dimensions. It is illustrative to consider an example of how parents in general understand the relationship between generations – the intergenerational contract. One of the men in Kasba Narwana pinned down the essence of the intergenerational contract when he described it as follows:

> "It is the obligation of the parents to provide education and to arrange marriages. Children's obligations to their parents are to study hard and have good morals. Parents expect them to take care of them. Parents do something for their children who are later expected to do something for their parents" (Int/Kasba/M/39).

However, this mutual understanding that has been passed on from generation to generation is portrayed differently by the young generation. In a discussion with a group of younger men in Chalola, who gave their views on what the situation is like now, one of them explained that:

> "The older generation still feels that they should have a son to take care of them in their old age. They expect it but are not sure about it. But, well, it's highly exceptional that sons don't take care of their parents, but when sons get married their wives – who are also very advanced – have demands on them so sons get stressed and don't have the time for their parents that they expect. Sometimes wives cooperate, but parents also expect too much from their sons. They have old-fashioned ways of thinking and try to influence and sometimes they pass judgments or give sanctions. They have

[13] The dimensions outlined here broadly reflect Kabeer's (1999) three dimensions of empowerment, i.e., *resources*, *agency* and *achievement*s.

> invested so much in their sons and get nothing in return. Indian parents are very bold [laughs…!!]; they keep on feeding their children. (Int/Chalola/M/47).

These two statements are highly illustrative of many aspects of concern here. To start with, both the former and the latter statements indicate the centrality of the *changing dependencies* between generations. They observe how parents have specific expectations, according to which they invest a great deal, but also how they are uncertain that these will be met. At the same time there is a refutation of there being any actual substance to this uncertainty.

As the case studies show, there is a difference in thinking between the young and their parents, but as the statement by the young man in Chalola further indicates, the generation gap has a lot to do with the fact that the young want to live their lives differently. This is something that the study has shown to be strongly related to the fact that the young have a different kind of knowledge. This is because they are formally educated, but also because they are the ones through whom most changes are realised. It is also related to a changing relationship to agriculture, in particular to the extent to which the young are interested in developing and investing in agriculture. In the second statement above it is therefore not surprising that parents are described as not really understanding the different situation their children are in. The first statement by the man in Kasba implies that the obligations are given with no room for negotiation. The fact that parents try to apply pressure or influence also hints at a one-way communication, one which resonates with the way people have been describing how the relationship was before – with parents deciding and the young obeying – as opposed to being characterised by a sharing of thoughts with each other. This change was also found in both more negative terms, in Rachhialu and Jassour, and in more positive terms, as in the villages in Kullu and in Kasba where it is more a question of cooperation. However, the point in both cases is that there has been a change in authority in which parents are no longer in control.

A final and central point which has been repeated continuously throughout the villages is that this problem is centred on the relationship between parents and their sons and not, as one might expect, on the relationship with daughters. However, changes to the intergenerational contract indirectly concern young women because intergenerational

relationships have been changed in the sense that younger women are no longer submissive to their mother-in-laws. Instead, Younger women are more actively involved in household decision-making. The authority of the older generation was characterised by the young 'obeying' and this was previously epitomised in the fact that the young daughter-in-law, being an outsider to her new family, was dominated by her mother-in-law, whereas they now decide together. The communication dimension is therefore an indication of adjustment. Table 4 presents items and indicators used.

Insert table 4 here

Calibration and translation into fuzzy membership values

The process of translating indexes based on these indicators into sets requires the specification of context-setting qualitative anchors for full membership, full non-membership, and the crossover point of maximum ambiguity in the set. These impose external standards that structure the set based on theory and substantive knowledge. The method used is the "direct method" described by Ragin (2008) which proceeds in two steps. Index scores are first translated into the metric of log odds. This, for example, means that scores of ≥ .99 membership are translated to log odds values of ≥ 5, while scores for the crossover point of 0.5 membership are translated to log odds values of 0. Set membership scores are then calculated using the formula below.

$$\text{Degree of Membership} = \frac{e^{\left(\log\left(\frac{p}{1-p}\right)\right)}}{1+e^{\left(\log\left(\frac{p}{1-p}\right)\right)}}$$

The degree of membership in a set is therefore the exponentiated log odds divided by unity plus the exponentiated log odds (Fiss, 2009). The log odd transformation brings the advantage of converting any interval variable into a set by using a metric that is symmetric around zero and has no floor or ceiling effects. The translated measures range from 0 to 1 and the converted scores conform strictly to the distribution dictated by the three qualitative anchors. In this study three fuzzy operators connecting subsets reflecting different dimensions of importance to each other to form sets are used (Smithson and Verkuilen, 2006). The *union* which corresponds to 'OR' in classical set theory and which takes the maximum of the sets. The *intersection* corresponds to

'AND' and takes the minimum of the sets. The *negation* corresponds to 'not' and is the complement of the set (i.e. negation of 0.7 is 1 – 0.7 = 0.3).

The process of setting the anchors is described in the following section. Table 5 presents the raw data and table 6 the fuzzy values for translated subsets and sets to which the following section continuously refers. Fuzzy membership values should *not* be confused with probabilities.

Insert tables 5 and 6 here

Very low CSR

Starting with the outcome set for very low CSR we use the natural sex ratio at birth as crossover; **953**. By setting the qualitative anchor for *full membership* at **474** which was the lowest CSR reported in any of the three sources (the Census data for Jal Graon), and the qualitative anchor for *full nonmembership* at **1347** which was the highest CSR in any of the three sources (the Census data for Kasba Narwana) internal variation is kept at a modest level. Setting generous qualitative anchors for full membership and full non-membership means that the variation of fuzzy membership values between villages is more conservative than the variation in the sources of CSR. This helps to avoid an over emphasis on extreme values as a result of the small samples. Also note that since the scores indicate membership in the set 'very low child sex ratios', villages with *low child sex ratios* have a *high* membership score in the set.

Dowry problematic

The relevant aspects of the dowry problematic discussed above were included in the questionnaire and an index was constructed based on them (see table 4). In order to evaluate changes over time, the same questions/statements were repeated in the moderated form of; "at the time I got married…". The data for dowry level and dowry change in table 5 clearly illustrates what the case studies showed. It was clear that dowry was important either as 'dowry level' or 'dowry increase', i.e. that it could be *either* one *or* the other; that the two dimensions are *substitutable* (Goertz, 2006). This implies a set relation that is captured by the fuzzy operator *union* which takes the *maximum* of the sets to be connected. The sizable increases in the two villages of Gojra and Sajla in Kullu district are particularly pertinent as they illustrate a qualitative

change from a state in which dowries were at a low level, to a state of sizable dowries. For the subset dowry level the qualitative anchor for the crossover point is set at **50** which has an important intuitive appeal as the point at which a majority agrees or does not agree. Correspondingly, the qualitative anchor for full membership is set at **100**, and for full nonmembership at **0**.

For changes in terms of dowry we use and translate the values for change presented in table 5. With a 20 per cent increase in agreement that dowry is a problem, we know that even in the case with the highest agreement for the present (Sajla), an increase of almost one third would have taken place. If we relate it to the case with the lowest agreement for the present (Chalola) we see that a 20 per cent increase would have meant an increase of almost the same size as the actual level, which would clearly have been a substantial and qualitative difference. Thus, we set the qualitative anchor for the cross-over point at **20**, the anchor for full membership at **40** and the anchor for full nonmembership at **0**.

We can thus see in table 6 how the memberships reflect what was found in the case study; that the dowry problem in Gojra and Sajla is related to the very substantial increase in the practice of dowry giving during the last ten to fifteen years. The measures also correspond to the fact that it is the major increase in dowry that is perceived as a serious problem in Kullu, whereby it is a problem with a long tradition in Kangra and Una.

Empowerment

,The aspects of empowerment discussed above were included in the survey (see table 4) and an index based on them produced the measurements presented in table 5. The setting of the qualitative anchors was again based on substantive case knowledge. Looking at the measurements for Gojra and Sajla, for example, it is immediately obvious that there are clear differences between these two villages with regard to empowerment. It is also clear that Sajla stands out with a very high level. This information also provides a first indication of what the anchor for full membership should be. Looking at the situation in Jal Graon, for example, the case study showed that the situation for women had changed from one where they had been living with a strongly repressive social climate restricting their lives. We also know that there has been a mobilisation and that women have become collectively stronger through their

work in the *Mahila Mandal*. They are also, through self-help groups and credit schemes, able to contribute economically to their households. In Jassour, on the other hand, although women have experienced improvements on a personal level, women's influence in village matters is limited. This is mainly attributable to the fact that the *Mahila Mandal* in Jassour is inactive due to personal disagreements within the group.

By setting the qualitative anchor for the crossover point at **0.2**, we make a distinction between villages along the lines discussed above, i.e. villages with active and successful *Mahila Mandals*, villages where, incidentally, women also contribute more to their household incomes. As already noted, Sajla stands out, and as we know that the fact that Sajla has such a high level of empowerment is related to cultural particularities in Kullu which allow women there freedoms women in other places in India only can imagine[14], we can conclude that Sajla is 'fully in' the set we are defining. Thus, we set the qualitative anchor for full membership at **0.5**. As no empowerment whatsoever would be of qualitative importance, we set the qualitative anchor for full nonmembership at **0.0**.

Change in Authority within the family

The set 'change in authority within the family' consists of the *intersection* of three subsets corresponding to the dimensions discussed above and specified below.

Proportion of non-farm income sources to total income

When comparing the figures in table 5 with that for the whole state of Himachal Pradesh (from the year 1993-1994, Lanjouw & Sharif, 2002) which at 51.7 per cent was the highest proportion in the country, we can see that the village figures are indeed high[15]. This figure also offers an idea of where to set an appropriate level for the crossover point. The setting of qualitative anchors is therefore straightforward for this subset. The crossover point is set at **0.5**. The anchor for full membership is set at **1.0** and the anchor for full nonmembership at **0.0**.

Disembedding

Indexes based on survey items on the two dimensions 'communication' and 'disembedding' (see table 4) were constructed. Follow-up items in the form of 'at the

[14] It is, for example, accepted for women in Kullu to smoke and consume alcohol.

[15] The same figures for the neighbouring states of Haryana and Punjab were 33.3 per cent and 36.2 per cent respectively.

time I got married….' were also used. Comparing these made it possible to see the change over time, both of which are presented in table 5. In terms of 'disembedding', there has been a clear qualitative change and this is evidenced by the fact that the villages where there is a majority agreement have also experienced substantial increases. Thus, for a measurement of 'disembedding' the criterion is that the village has had *both a high level and considerable change*. The fuzzy operator *intersection* captures this connection between the two dimensions. This means that membership in a set of level and change is defined as the *minimum degree of membership in both subsets*. In all the three villages that have *not* had an increase, but rather a decrease, the young people take an interest in agriculture. This shows the importance of the shift away from agriculture and the economic change that respondents point out as being central and of particular importance in generational terms. In defining the qualitative anchors for 'disembedding level' we once again set the anchor for the crossover point at **50**. We set the anchor for full membership at **100**, and the anchor for full nonmembership at **0**.

As a change greater than 50 per cent would entail a change consisting of more than the majority, anything above 50 per cent can be considered 'fully in' the set and we therefore set the anchor for full membership at **50**. Since three villages have had negative changes it is clear that all positive change is of interest and the anchor for full nonmembership is therefore set at **0**. If, for example, we consider Jassour and Rachhialu, it can be observed that they have an important, albeit moderate, level of disembedding. We also know from these two cases that changes in precisely these terms have been important and frequently described. At the same time, we know there is a qualitative difference in level of change between them and Jankaur which has not experienced any significant change and also does not have a particularly high level. By setting the crossover point at **20,** we therefore determine that Jassour and Rachhialu are more in than out of the set and that Jankaur is more out than in.

Communication

In all villages, with one exception, an overwhelming majority of respondents agreed, or strongly agreed, that this was the case. The pattern suggests that the villages that have undergone larger positive changes have done so because they have 'caught up' with villages having already had a high level of communication. However, the fact that all villages have a high level implies that the crucial factor is not the level of change but the

actual level of ‘communication’ itself. Furthermore, the changes have not entailed qualitative changes since, with the exception of Kasba, all the villages also previously had a majority agreement for communication. We therefore define the qualitative anchor for the crossover point for the subset ‘communication’ at **50,** which has an important intuitive appeal as the point at which a majority do or do not agree. We set the qualitative anchor for full membership at **100**, and the qualitative anchor for full nonmembership at **0**. We thus encompass the whole range of the dimension.

The intersection of the three dimensions – and thus the presence of all three – constitutes a change in authority within the family. More specifically, a high level of dependence on non-farm sources of income is present in cases with ‘communication’ and ‘disembedding’. This suggests that, as respondents have explained in so many ways, the economic changes and the shift away from agriculture toward non-farm activities is a necessary condition for the familial changes concerned. The fuzzy values presented in table 6 thus illustrate the qualitative differences revealed by the analysis of the case material; that there have been changes in authority within the family in the villages of Jassour, Rachhialu, Chalola and Jal Graon. Table 7 gives an overview of all qualitative anchors used.

Insert table 7 here.

Fuzzy set analysis

Using fuzzy set membership values for each case it is possible to produce a so-called truth table. In this table each village – each case – represents one horizontal row with its specific combination of conditions. Each vertical column represents a condition or a combination of conditions. For the sake of clarity, membership values above the crossover point 0.5 are presented in block letters.

Insert table 8 here.

Looking at the table from an ideal typical perspective reveals that the villages Jassour and Rachhialu share the same combination of conditions and thus constitute one *configuration*. This is a typical aspect of fuzzy sets, Jassour and Rachhialu are qualitatively the same configuration but they nevertheless vary in degree. Using upper

case letters to depict the presence of a condition and lower case letters to depict the absence of a condition, the configuration for Jassour and Rachhialu is: DOWRY* empow*AUTHORITY. Where the * sign denotes logical AND. It is also possible to find the respective membership of those two villages in that particular configuration. The *lowest* membership value of all three conditions defines the membership in the configuration. For Jassour, for example, it is 0.65 in DOWRY, 0.65 in empow – the absence of empowerment – (the negation and inversed value of EMPOW 0.35, i.e. 1 – 0.35) and 0.56 in AUTHORITY, hence 0.56 in this particular configuration of conditions.

Analysing the truth table starts with an analysis of necessary conditions using the fuzzy set truth table algorithm. Each condition is analysed separately with the outcome set. *None of the three conditions of change are consistent with being a necessary condition*. However, we have already specified that son necessity is. The cultural schemata centred on a perceived need for a son is constitutive to both of the two paths found. It is the structuring quality of the cultural need for a son that 'determines the tracks' along which the new interests connected to new social and economic realities 'push action' (Weber [1915] 1946, in Swedberg, 2003). As a necessary but insufficient condition it is a precondition for both and it is in these two particular combinations that one can begin to speak about causality. This is because it constitutes the "culturally constrained array of opportunities available" (Thornton & Fricke, 1987:770). We divided analysis into two parts and are now considering these conditions of changes in context in combination with the necessary condition son necessity. Continuing with an analysis of sufficient conditions results in the following solution:

SON NECESSITY (DOWRY*empow + AUTHORITY) → CSR

Spelling out this formula verbally reads as follows; son necessity together with a dowry problem without empowerment or son necessity together with a change in authority within the family leads to low child sex ratios. *There are thus two alternate paths leading to low child sex ratios*. This solution has a consistency of **1.0** which means that *cases exhibiting these causal conditions uniformly exhibit the outcome*. The solution has a coverage of **0.751** which can be understood as *75% of the empirical content being*

covered – or accounted for – by this solution. The membership of the separate cases in these two conditions, and combination of conditions, are depicted in the columns De and A in the truth table above, where De stands for membership in 'dowry without empowerment' and A stands for membership in 'change in authority within the family', again remembering that capital letters signal presence of the condition. The fuzzy membership value 0.86 for Gojra in De thus indicates the degree to which Gojra is part of the ideal typical concept 'dowry without empowerment'.

In a solution with two combinations it is important to partition the coverage unique to each combination from the total coverage of the solution. In doing this we see that the unique coverage for the condition 'dowry without empowerment' is at 0.199, i.e. 20% is covered by this combination. The unique coverage for the combination 'change in authority' is 0.206, i.e. 21% is covered by this combination. Considering that the coverage for the whole solution was 75%, one more calculation is needed::

$$0.751 – (0.206 + 0.199) = 0.346$$

By subtracting the unique coverage of each of the two combinations from the solution coverage, we receive a figure of roughly 35% which is the *overlap* of the two combinations. This is the part of the empirical content covered by both combinations. By returning to the truth table once again, this time focusing attention on Jassour and Rachhialu, it is clear that these two cases have a low child sex ratio and the condition 'change in authority within the family'. However, both also have dowry problems and this is where the two causal combinations overlap. Again, there is a correspondence between this finding and what the case studies showed. What respondents stated here with regard to dowry was that many young people have started refusing to take dowries because they are aware of the disastrous social effects it has. However, it was also explained that it is nonetheless common for youths to accept a dowry as it comprises a tempting amount of starting capital for young males who are in a pressurised situation of not finding employment. Here, the dowry problem is therefore related to, and feeds into, the dynamic of changing authority within the family. Thus, in these cases dowry therefore has a *compounding effect* as it adds to the already unfortunate condition. It is also important to note the difference between dowry together with an absence of empowerment, and dowry on its own. Looking at the two conditions of 'empowerment'

and ‘dowry’ in the truth table clearly shows that dowry is present in cases with a low child sex ratio *only when empowerment is absent*.

When studying sufficient conditions, it is essential to give specific attention to villages that do not have the problem of low child sex ratios, here, the villages of Sajla, Kasba Narwana, and Jankaur Khas. The first thing to note is that the empowerment of women plays a prominent role in the development of these villages, perhaps with the exception of Kasba. But although Kasba has a membership of only 0.24 in the empowerment set, it might be important in terms of how the degree of empowerment stands in relation to membership of the other sets. Particularly since Kasba Narwana has experienced generally less changes. The presence of empowerment in combination with dowry seems to have a dampening effect on dowry and a countering effect on reactionary change. However, the presence of both empowerment and shift in authority as in Jal Graon suggests that empowerment does not have any dampening effect on a ‘modern’ change pattern because it is an integral aspect of that same change.

Figure 2 below visually summarizes the relationships between conditions the analyses have revealed by using the system of symbols developed by Goertz & Mahoney (2006) and Goertz (2006). After this “analytic moment” the crucial step is to *return to the data* for further *interpretation* which is done in the next section.

Insert figure 1 here.

Son necessity, the dowry problem and absence of empowerment

This path directly concerns women and an increase in the perception that daughters are a liability, something which has emerged simultaneously with considerable economic development. Numerous studies have found that modernization of agriculture affects men and women differently (Sharma, 1980, Mencher & Saradamoni, 1982, Sen, 1982, Agarwal, 1985, 1986, Bardhan, 1985a, 1985b, Saradamoni, 1987, Bhalla, 1989, Shiva, 1991), and some have indicated that one important reason for this is that economic development may be accompanied by the closure of traditional opportunities for women to contribute economically without the introduction of new alternatives (Boserup, 1989 [1970], Bossen, 1975, Mazumdar, 1975, Sharma, 1980). Son necessity has structured the path of change in that the prosperity that has come about through a structural change

in the local economy from mixed agriculture to horticulture, as has been the case in Kullu, also has entailed a *worsening of the relative position of women in the household* (Agarwal, 1986, Bossen, 1975).

One of the most convincing arguments for the existence of dowry is that to some extent it is a compensation for a diminished economic contribution from women (Miller, 1981, Bardhan, 1984). The recognition that dowry is essentially a devaluation of women (Kabeer, 1999) highlights the central relationship between dowry and empowerment.

The change from a local economy based on mixed agriculture to a prospering horticultural economy in Kullu district has had a direct influence on the emergence of dowry as a problem. The management of orchards, a central aspect of which is organising and monitoring labour, is now carried out exclusively by men. It is also now men who undertake the technical aspects of orchard work and in particular it is young men with good educations who are considered to be suitable for this position. At the same time women have withdrawn from most of the substantive work associated with agriculture to which they previously contributed. As a result of the economic development women perceive their situation today to be considerably better than it was before even though the relative position of women within the household has worsened for this same reason. As women's economic role has become marginalised, gender relations have become redefined, and as the relative position of women in the household has declined the dependence on sons has increased.

This is perhaps revealed most clearly in the major difference in *empowerment* between Gojra and Sajla particularly in the size of the contribution that women make to their households. The new sources of income generation were the result of the collective efforts women in Sajla achieved through their work in the *Mahila Mandal*. It has provided a substitute for the sources that were lost with the change to horticulture. However, the role of the vibrant *Mahila Mandal* in Sajla in relation to the inactive one in Gojra is not reducible to economics. The collective dimension has been important in creating the conditions for change and empowerment. When women initiate changes in their life situations as a group it becomes less difficult, or costly, for each individual to effect change in her own situation than it would be if she was acting alone in the village (Kabeer, 1999). Dowry giving is also related to desires for prestige and is often an attempt at gaining *status*, something which has been found to be particularly the case

among farm families whose economic position has improved (Epstein, 1973, Sharma, 1980, Agarwal, 1986, Srinivasan, 2005). It is therefore not surprising that dowry has emerged as a problem in Kullu simultaneously with economic confidence and prosperity becoming a reality through the conversion to an orchard economy. The withdrawal of women to home-bound work and the adoption of customs such as dowry play into the dominant status structure and strengthens the view that women and girls are economic liabilities.

Both the structural changes and the prosperity of the economy in Kullu are firmly rooted in the possession of land, land which has consequently become immensely valuable. Because of this there is a strong perception that passing on property to daughters, even though it is their legal right to inherit an equal share, *threatens the social order*, not merely on the individual or household level but also on a community or village level. It also appears that the more agriculturally dependent the village, the more the empowerment of women is likely to be perceived as a threat. That property should end up in the hands of outsiders, through a woman inheriting and her husband becoming its owner provoked the verbalisation of major concerns. In the same way as a reason for son necessity is that it is seen as necessary in order to maintain the continuity of the village as a social unit, property rights for women are seen as a challenge to it. That a woman actually claims her legal part of the family land, however, is extremely unusual. This also brings out yet another crucial point; namely that it is not the actual extent to which daughters do take legal action – or that sons neglect to take care of their parents in old age as in the other path – but the *uncertainty* related to the increased possibility that they might that is decisive.

There are thus two distinct developments related to the context of this path which both are the results of an interplay between the cultural notion of son necessity and socio-economic change; A *worsening of the relative position of women* in the household has been accompanied by a *dowry problem* and the *perception of women's autonomy as a threat to the local social order* related to a possible claim of legal right to land.

Son necessity and uncertain intergenerational contracts

This second path of change in authority within the family in combination with son necessity also concerns a change in context but it directly concerns sons where the indirect result is the exclusion of daughters. The path can be summarised as follows: As

the intergenerational contract has come under *constraint* – intensifying the importance of each child – the *relative importance of sons* has increased while the *room for daughters has diminished*.

Despite the fact that this path represents a challenge to the structural role of the son, the intergenerational contract has not been broken but instead 'renegotiated' (Croll, 2006)[16]. The central feature of this renegotiation process is a *change in authority within the family*[17]. A major explanation of this is the fact that there are no or few alternatives to the family as provider of social security in old age in India (Kabeer, 2000).

The first important aspect contributing to why the intergenerational contract has come under constraint is the *change to smaller families*. Another important aspect has been education as it makes raising children more costly (Caldwell et al, 1982, Croll, 2000). Given limited resources, parents have chosen to invest more resources in each child while having fewer children (Becker & Lewis, 1973). As has become clear in the villages in this study, the number of children per couple is very small. Dependency relations in the context of the intergenerational contract have therefore become accentuated and parents now face a *greater dependence on each child*. Not only is each child provided with more in terms of care and education, the expectations placed on each individual child have also increased. The result is increasing competition between generations and between sons and daughters for a share of the family's tangible and intangible resources as the cost of raising children has increased and the number of children has decreased.

The second aspect of an *increase in relative importance of sons* is directly influenced by the change in authority within the family. In order to save the intergenerational contract in the face of changes from the disembedded young, *parents have been forced to accommodate and adjust*. In the context of this path, the economic development entails a shift away from agriculture. However, the shift is also associated with two social changes of central importance as they result in a change in authority within the family.

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[16]One of the strongest fears regarding development in Asia, based on assumptions of modernization theory, has been that the spread of individual rather than collective family interests deriving mainly from a shift away from agriculture and toward new lifestyle aspirations, migration, urbanization, and the demographic transition to fewer children would erode the intergenerational contract.

[17] It should be noted that other studies have also shown that these are no isolated events but developments that have been found to take place throughout Asia (Croll, 2006).

One of the two dimensions entails the *disembedding* tendencies that increase the gap between generations in the form of a more independent younger generation. This disembedding of the young is directly related to the economic development in that it entails a low interest in agriculture. The young are trying their hardest to take advantage of the education they have been provided by finding employments. In doing so they are also trying to fulfil the higher level of parental expectations. These expectations are the connection to the second social dimension, a high level of *communication*, which was understood as an indication of parents' adjustment.

These changes to the intergenerational contract, however, have coincided with *parents feeling considerably uncertain as to their entitlement to support in old age* as exemplified by the large and general decline in trust in sons. Parents avoid this uncertainty in the same way that they accommodate to their sons. They invest more in them, particularly in the form of education, and they do so over prolonged periods of time. The most important consequence of this is therefore that authority itself has changed, and it is no longer parents who decide and children who obey.

The average number of children per couple showed that the fewer the children in a family, the larger the proportion of sons. As a result of the fact that people feel a distinct need to have at least one son, this has had an 'intensifying effect' (Das Gupta & Mari Bhat, 1997) on the gendered composition of families. This promotes a situation in which purposive and strategic behaviour is increasingly called for. One particularly powerful example of this is the way in which there has been a change in inheritance practices in all eight villages. Nowadays parents consciously delay the transfer of property, setting it up so that it is not transferred until they themselves have passed away. This ensures a mechanism of dependence throughout their lifetime, although with the important caveat and source of uncertainty that children may very well have become independent through their own efforts outside of agriculture. The son necessity has structured this change in authority by heightening parents' dependence not only on their children, but specifically on their sons. Clearly, there has been an increase in the *relative importance of sons* within the institutional framework of the intergenerational contract.

A substantial proportion of families were also found to have no daughters at all. There was also found to be a contradictory nature to respondents' statements with regard to

how they talked about daughters. Daughters are nowadays perceived to be very trustworthy, hard working and dependable, but nonetheless as major liabilities. One key aspect to this is the fact that the role of the son and the role of the daughter is seen as opposite where the role assigned to daughters is negatively defined as what sons are not. These are aspects that show how an increase in the relative importance of sons means that *there is decreased room for daughters*. It is precisely because daughters are not alternatives that they are instead net liabilities.

As discussed in relation to the path of dowry without empowerment, daughters' autonomy was described as a possible threat to the local social order not only in Gojra but also in Jassour and in Chalola. Such aspects which strengthen the perception of daughters as liabilities compound the problem in the context of this path by further limiting the already limited room for daughters. These developments have had the tragic effect of creating a context in which proactive behaviour is not only called for, but where it has even become rational to exclude daughters. It is within this constrained frame of dependence between generations, with an intensified importance placed on each child, that the relative importance of the son has increased, thus diminishing the room for daughters.

Conclusion

The coexistence of son necessity and socio-economic changes which requires an increased need to "balanc[e] members against resources", as Kaur (2008:112) puts it, entails an increased constraint on the intergenerational contract. As the 'frame of dependence' has tightened, the competition between members for resources has increased, and the difficulty of achieving a 'balance' has become greater. The 'space' available to meet the expectations and obligations invested in the intergenerational contract has diminished. This has meant that parents now face a greater dependence on each child. But in the absence of an alternative the perception of a necessity of having "at least one son" has remained, leading increasingly to daughters being excluded.

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Table 1. Sex ratios and child sex ratios for selected states, districts and villages

	State	1991		2001		Change in CSR
	(districts - villages)	Sex Ratio	CSR	Sex Ratio	CSR	1991-2001
	India	**927**	**945**	**933**	**927**	**-18**
1	Punjab	882	875	874	793	-82
2	Haryana	865	879	861	820	-59
3	Gujarat	934	928	921	878	-50
4	Delhi	827	915	821	865	-50
5	Himachal Pradesh	976	951	970	897	-54
	Kullu	920	966	928	960	-6
	Gojra				542	
	Sajla				1180	
	Kangra	1024	939	1027	836	-103
	Jassour				615	
	Rachhialu				664	
	Kasba Narwana				1118	
	Una	1017	923	997	839	-84
	Chalola				666	
	Jal Graon				694	
	Jankaur Khas				1087	
6	Rajasthan	910	916	922	909	-7
7	Uttar Pradesh	876	927	898	916	-11
8	Maharashtra	934	946	922	917	-29
9	Madhya Pradesh	912	941	920	929	-12
10	Bihar	907	953	921	938	-15

Note: States arranged in ascending order based on level of CSR in 2001.
Source: Census of India, various years. CSR figures for villages represent the mean of three sources; the 2001 Census of India, the Village Health Records/Family Health Records (names vary according to district), and own figures from field work.

Table 2. Son preference ranking

	A son is necessary…						
	1st	2nd	3rd	4th	5th	6th	Total
...for old age support	**57.3%**	25.9%	11.8%	2,1%	1.8%	1.0%	100%
...to carry on the family name	30.4%	**31.3%**	23.3%	8.0%	3.2%	3.8%	100%
...to perform rituals at parents' death ceremony	12.1%	30.1%	**33.2%**	11.0%	7.6%	5.9%	100%
...as someone to pass property on to	6.3%	9.5%	13.0%	**35.2%**	20.4%	15.5%	100%
...for building social relations	1.1%	7.0%	9.5%	29.5%	**34.7%**	18.2%	100%
...for labour in agriculture	2.2%	7.3%	13.9%	15.7%	20.8%	**40.1%**	100%

Note: The alternative 'other reasons' was only mentioned by 4.5% of respondents and was therefore not included

Table 3. Declining trust in sons as providers of old age support

	At the time I got married we trusted our son to take care of us in our old age		We trust our son to take care of us in our old age	
	Agree	Disagree	Agree	Disagree
Overall	**65.1**	**12**	**9.8**	**60.9**
Gojra	69.5	17.4	8.5	78.8
Sajla	58.5	9.5	7.6	52.8
Jassour	58.7	8.4	9.6	47.6
Rachhialu	48	12	10	52
Kasba Narwana	69.8	9.3	2.3	84.1
Chalola	69.2	11.8	9	60.7
Jal Graon	72.5	15	10	55
Jankaur	75.4	11.5	19.7	62.7

Note: for the remaining percent respondents answered 'neutral'. Figures denote valid percent

Table 4. Items and indicators used for indices

Dowry	
Dowry is a problem in our village	(v94)
People in our village give dowry to raise their (family's) status	(v102)
The rich people in our village give more in dowry than others	(v98)
In our village castism is practiced	(v90)
A woman who does not bring dowry to her new home will face difficulties	(v106)
At the time I got married, dowry was a problem in our village	(v95)
At the time I got married, people in our village gave dowry to raise their (family's) status	(v103)
At the time I got married, the rich people in our village gave more in dowry than others	(v99)
At the time I got married, castism was practiced in our village.	(v91)
At the time I got married a woman who did not bring a dowry to her new home would face difficulties	(v107)
Empowerment	
Women in our village are aware of their rights	(v47)
Our *Mahila Mandal* improves women's situation	(v60)
Women in our village don't veil themselves when they leave the home	(v49)
Women in our village freely make contact with people who are not family members	(v51)
Our *Mahila Mandal* contributes to the development of our village	(v62)
Decisions on village matters are not taken without women	(v55)
Households where women also take decisions on household matters are more prosperous	(v57)
The proportion of household income which the wife contributes	(WifeContri)
Empowerment = ((v47+v60+v49+v51+v62+v55+v57)/7)*WifeContri	
Change in authority within the family	
Communication	
Parents understand the different situation their children are in	(v74)
Parents and children communicate well and share their thoughts with each other	(v76)
Mothers-in-law and daughters-in-law together decide how to do household work	(v86)
Disembedding	
The young generation is not interested in developing and investing in agriculture	(v78)
There is a difference in thinking between the young and their parents	(v80)
The young want to live their lives differently than their parents	(v82)
Younger women are more actively involved in household decisions	(v66)

Table 5. Raw data

	CSR[a]	Dowry problematic		Empowerment[d]	Change in authority within the family				
		Level[b]	*Change*[c]		*Non-farm prop.*[e]	*Disembedding*[f]	*Disembedding change*[g]	*Communication*[h]	*Communication Change*[i]
Gojra	542	46,8%	34,2%	0.0801	0.31	33.4%	-17.8%	95.8%	8.3%
Sajla	1180	63,3%	36,5%	0.5915	0.52	44.2%	-4.7%	81.1%	-13.4%
Jassour	615	60,4%	-2,2%	0.1598	0.81	53.8%	23.5%	82.4%	1.9%
Rachhialu	664	54,6%	5,4%	0.1093	0.83	59.3%	26.0%	90.8%	1.9%
Kasba	1118	2,6%	0,0%	0.1218	0.70	11.5%	-24.6%	55.5%	16.5%
Chalola	666	22,9%	-3,6%	0.1286	0.86	65.0%	40.4%	85.0%	23.1%
Jal Graon	694	28,3%	0,0%	0.2715	0.82	57.7%	39.9%	82.3%	24.8%
Jankaur	1087	31,4%	-16,4%	0.3575	0.77	40.0%	8.9%	83.1%	16.9

[a] figures depict mean of three sources, [b] figures depict degree agree or strongly agree in valid per cent, [c] figures depict difference in agree or strongly agree in valid per cent between "at the time I got married…" and present, [d] figures depict index based on Likert items and proportion wife contributes to household income, [e] depicts proportion of non-farm income sources of total household income, [f] figures depict degree agree or strongly agree in valid per cent, [g] figures depict difference in agree or strongly agree in valid per cent between "at the time I got married…" and present, [h] figures depict degree agree or strongly agree in valid per cent, [i] figures depict difference in agree or strongly agree in valid per cent between "at the time I got married…" and present.

Table 6. Fuzzy membership values for subsets and sets

	CSR	Dowry problematic		Empowerment	Change in authority within the family					
					Non-farm prop.	*Disembedding*		*Communication*		
			(Union[a])			*(Intersection[b])*				*(Intersection[c])*
Gojra	**0.93**	**0.89**	=max(0.45, 0.89)	**0.14**	0.24	0	=min(0.26, 0)	0.94	**0**	=min(0.24, 0, 0.94)
Sajla	**0.15**	**0.92**	=max(0.69, 0.92)	**0.98**	0.53	0.02	=min(0.41, 0.02)	0.87	**0.02**	=min(0.53, 0.02, 0.87)
Jassour	**0.89**	**0.65**	=max(0.65, 0.03)	**0.35**	0.87	0.56	=min(0.56, 0.59)	0.87	**0.56**	=min(0.87, 0.56, 0.87)
Rachhialu	**0.86**	**0.57**	=max(0.57, 0.1)	**0.20**	0.88	0.63	=min(0.63, 0.65)	0.92	**0.63**	=min(0.88, 0.63, 0.92)
Kasba	**0.22**	**0.05**	=max(0.05, 0.05)	**0.24**	0.76	0	=min(0.09, 0)	0.58	**0**	=min(0.76, 0, 0.58)
Chalola	**0.86**	**0.2**	=max(0.2, 0.03)	**0.26**	0.9	0.71	=min(0.71, 0.88)	0.89	**0.71**	=min(0.9, 0.71, 0.89)
Jal Graon	**0.83**	**0.21**	=max(0.21, 0.05)	**0.67**	0.87	0.61	=min(0.61, 0.88)	0.87	**0.61**	=min(0.87, 0.61, 0.87)
Jankaur	**0.27**	**0.25**	=max(0.25, 0)	**0.83**	0.83	0.25	=min(0.35, 0.25)	0.88	**0.25**	=min(0.83, 0.25, 0.88)

Note: Values in block figures mark final set membership, remaining values mark subset membership.

[a] Values in parenthesis depict membership values for dowry level subset and dowry change subset respectively. [b] Values in parenthesis depict membership values for disembedding level subset and disembedding change subset respectively. [c] Values in parenthesis depict membership values for non-farm proportion subset, disembedding intersection subset and communication subset respectively.

Table 7. Qualitative anchors

	Full membership (1)	Crossover point (0.5)	Full nonmembership (0)
Very low CSR-Outcome	474	953	1347
Dowry			
Dowry level	100	50	0
Dowry Change	40	20	0
Empowerment	0.5	0.2	0
Change in authority			
Non-farm proportion	1.0	0.5	0
Disembedding level	100	50	0
Disembedding change	50	20	0
Communication	100	50	0

Table 8. Truth table with case membership in consistent conditions

village	**Dowry (D)**	**Empow (E)**	**Authority (A)**	**De[a]**	**A[b]**	**CSR**
Gojra	**0.89**	0.14	0	**0.86**	0	**0.93**
Sajla	**0.92**	**0.98**	0.02	0.02	0.02	0.15
Jassour	**0.65**	0.35	**0.56**	**0.65**	**0.56**	**0.89**
Rachhialu	**0.57**	0.20	**0.63**	**0.57**	**0.63**	**0.86**
Kasba	0.05	0.24	0	0.05	0	0.22
Chalola	0.2	0.26	**0.71**	0.2	**0.71**	**0.86**
Jal Graon	0.21	**0.67**	**0.61**	0.21	**0.61**	**0.83**
Jankaur	0.25	**0.83**	0.25	0.17	0.25	0.27

Note: [a] depicts membership in the combination of conditions "Dowry without empowerment" where the upper case letter depicts presence and lower case letter depicts absence. [b] depicts membership in the condition "Change in authority within the family". [a] and [b] thus depict memberships in the two consistent conditions.

Figure 1. Relationships between conditions