Measuring Women's Empowerment: A Latent Class Approach*

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1 Introduction

Gender equality and empowerment of women were established as the third Millennium Development Goal (MDG3) by the United Nations. Although specific targets set under MDG3 were limited to girls' education and women's labor and political participation, the goal calls attention to the broader need to promote gender equality and empowerment of women. Further, gender equality and women's empowerment have been at the forefront of discussions around the post-2015 development agenda.

One challenge to monitoring progress toward women's empowerment is how to measure it. As Mamhud, Shah and Becker [6] have noted, women's empowerment is difficult to measure quantitatively. Women's empowerment is a latent concept, and therefore, not directly observable. We can only examine various aspects of women's empowerment by examining a set of observable characteristics, such as decision making abilities in the household or mobility.

Further, inherent in the definition of empowerment is the concept of change. One often

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cited definition by Kabeer[3] states that women's empowerment is "an *expansion* in the range of potential choices available to women so that actual outcomes reflect the particular set of choices which the women value."Accordingly, empowerment signifies a change in capability. Measuring change in status requires observations at at least two points in time. Without longitudinal data, we are only able to measure the possible outcomes of the change, rather than the process of empowerment itself.

Lastly, since women's empowerment is specific to the context of the individual woman, it is difficult to develop a standard measure. As Kabeer's [3] definition states, the outcomes must reflect those that the women value. These values may vary not only by cultural and historical context, but also from individual to individual according to family background, socioeconomic status, and personal preference.

Because of these challenges, many existing studies treat the various dimensions that characterize women's empowerment separately when examining women's empowerment as an outcome. For example, they will examine factors such as decision making, attitude toward violence against women, and control of resources, separately from each other. However, when these measures are examined separately, we may miss overall patterns of empowerment that arise from an integrated approach to these dimensions.

Other studies have developed combined measures of women's empowerment, but reduces empowerment into a dichotomous variable or on a linear scale, and may overlook the complexity of the interactions between the various dimensions of empowerment.

This paper explores an integrative approach to measuring women's empowerment using latent class analysis. Latent class analysis has been used to create an index for measuring women's autonomy in another study[4], but the index was used as an independent variable and its patterns and relationships to other factors were not explored. A similar approach to creating a women's empowerment measure was done using factor analysis [11]. This

paper uses latent class analysis because the data are categorical.

The aims of this paper are to:

1. understand the typology of women's empowerment among married women in Matlab, Bangladesh using an integrated approach;

2. determine the proportion of women in each of the women's empowerment groups within this typology; and

3. examine the relationship between these groups to three major factors that influence women's empowerment: age, spousal migration, and position in the household.

2 Data and Methods

2.1 Data

Data for this analysis come from the Matlab Health and Socioeconomic Survey 2 (MHSS2), which was the second wave of a longitudinal survey that followed up individuals from the first wave conducted in 1996. Matlab is a rural area of Bangladesh about 55 km from the capital city of Dhaka. The International Centre for Diarroeal Research, Bangladesh (icddr,b) has been maintaining a Health and Demographic Surveillance System (HDSS) in this site since 1966. The HDSS registers all births, deaths, marriage, and migration events occurring in the area. The bulk of the data collection for MHSS2 in Matlab was conducted between September 2012 and May 2013. The MHSS2 builds upon the HDSS data by using key demographic variables from the HDSS database, then asking additional detailed questions from individuals in the MHSS2 sample. The analytic sample consists of 5,896 ever married women between the ages of 15 and 74, who resided in the Matlab study area at the time of the survey and for whom we have complete data on the variables used for the analysis.

2.2 Definition

Mahmud, et al. [6] defines women's empowerment as: "having increased life options and choices, gaining greater control over one's life, and generally attaining the capability to live the life one wishes to live." As discussed above, measuring *change* in life options and choices is not possible when using data from one time period. Therefore, in this study, we are examining the outcomes of probable increase in life options and choices, by studying the indicators of having control over one's life and gender equivalent attitudes. We make the assumption that in order for a woman to have control over one's life, she has undergone a change.

2.3 Measures

Based on previous work on dimensions of women's empowerment [6, 7, 8, 10, 11], we identified six measurable dimensions of women's empowerment. These dimensions include four behavioral and two attitudinal dimensions:

1. Behavioral

   - Decision making

   - Control of resources

   - Mobility

   - Civic participation

2. Attitudinal

   - Gender equivalence

   - Attitude toward domestic violence

2.3.1 Decision Making

Decision making was measured by a set of questions regarding who makes the decisions in the household. Responses to the following questions were included.[1]

1. Who in your family has (or had) final say about ...

   (a) Major household purchases

   (b) Decisions related to spouse's health and treatment

   (c) Decisions about your health and treatment

   (d) Your visits to family or relatives

   (e) Whether to use contraception

   (f) Regarding the number of children to have

2. Are you consulted or asked to participate in making decisions for the household such as selling rice?

A dichotomous variable was created with '1' if the respondent said she was involved in decision making for all or all but one of the questions and '0' otherwise.

2.3.2 Control of Resources

Control of resources was determined by whether the respondent has any cash savings, whether she can spend money without permission, and if she had taken out a microcredit loan, whether she decided how to spend the loan.

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[1]The questionnaire also asked who decides about participation in community/political activities or organizations and type of contraceptives to use. The former was excluded from the analysis because of the large number of "not applicable" responses. The latter was excluded because it was highly correlated with the question on whether to use contraception. The analysis also excluded some questions regarding whether the woman has the final say about decisions regarding children's health care and schooling. These were excluded because only a subset of women who had children answered the questions.

1. Do you have any cash savings?

2. Do you need permission from anyone to spend money you yourself have earned, borrowed, or saved?

3. Do you need permission from anyone to purchase, or send someone to purchase, items for the household such as food or cooking oil?

4. Who decided how the last microcredit loan was spent or used? (Coded as '1' if self was included)

If a woman answered yes to the first question, no to the second and third questions, or if she said she herself decided on how the last microcredit loan was spent, then she was considered to have control over resources.

2.3.3   Mobility

The mobility dimension was measured by asking whether during the past 12 months if the respondent ever go to the following locations and whether she went alone or with someone else.

1. Visit women in other $baris^2$ to talk

2. Visit outside the village/$moholla^3$

3. Visit any place riding on public transport

4. Neighborhood store to make small purchases

5. Store or market to make larger purchases such as clothing

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[2]A *bari* is a group of houses in a compound usually occupied by relatives.
[3]A *moholla* is an urban neighborhood

Because going alone or with someone could reflect preference (e.g. she does not like to go out by herself), mobility restriction (e.g. she is not allowed to travel to certain places by herself or does not feel safe), or practical considerations (e.g. she does not have anyone to watch the children while she goes out by herself), the responses were recoded as '1' if the respondent went to these locations and '0' if not. A mobility score was created by summing up the responses. A mobility indicator was created by dichotomizing the mobility score, with '1' for women with mobility score in the highest quartile.

2.3.4 Civic Participation

Another dimension used to measure women's empowerment was the level of participation in public life. If a woman voted or participated in community management or NGO groups, then she was considered to have participated in civic life.

1. Did you vote in the last parliament (MP) election in 2008?

2. Did you vote in the most recent union/*pourashava* council elections?

3. In the past 12 months, how often did you participate in any political march, political rally or political movement?

4. In the past 12 months, how often did you participate in a meeting of any community management group like village society (*samaj*), village court (*shalish*), union council, or school committee?

5. In the past 12 months, how often did you participate in a meeting of a community based organization or NGO?

Based on these questions, we created a dichotomous variable where if a woman answered yes to any of the civic participation questions, she was given a value of '1' and '0' otherwise.

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2.3.5 Gender Equivalency

The gender equivalency measure was constructed using the following sets of questions. The questions asked the respondent to agree, partially agree, or disagree with six statements.

1. Women should practice purdah.

2. Girls should be educated as much as boys.

3. Women should be allowed to go out alone to the market or to visit their relatives.

4. Women should have the right to initiate a divorce.

5. Parents could be financially supported by a daughter in their old age.

6. A husband and wife should decide together if they want to have children.

Except for the first question, a value of 1 was assigned if the respondent agreed with the statement and 0 if she only partially agreed or disagreed. Hence a gender equivalent response was coded as 1, while gender non-equivalent response was coded as 0. For the first question, the coding was reversed such that if the respondent agreed with the statement, the response was coded as 0, and 1 if disagreed or partially agreed. For each respondent, the responses were summed to create a gender equivalence score. These scores were further coded as 1 if the respondent had above median gender equivalence score and 0 if not.

2.3.6 Attitude toward Domestic Violence

Acceptability of domestic violence constituted another attitudinal dimension. These questions asked about whether a husband is justified in physically hurting or beating his wife under the following conditions:

1. if she goes out without telling him;

2. if she does not obey family elders;

3. if she neglects the children; and

4. if she refuses to have sex with him

If the respondent replied that violence was justified under any of the listed conditions, the indicator was given a value of '0' and '1' otherwise.

2.3.7 Covariates

The covariates used in the analysis were age, whether the husband is present in the household or not, and whether the woman is the head of household or the spouse of the head of household.

2.4 Analysis

Latent class analysis was used to categorize respondents into empowerment groups. Latent class analysis identifies unobserved (i.e. latent) subgroups that explain observed response patterns of categorical variables [1, 2]. The model estimates the class-conditional response probabilities for each manifest variable and the population share of observation corresponding to each latent class. It also assigns the most likely class membership based on the response patterns of the observed variables.

We used the following model:

$$P(y) = \sum_{c=1}^{C} \pi_c P_{i|c} P_{j|c} P_{k|c} P_{l|c} P_{m|c} P_{n|c} \tag{1}$$

where $P(y)$ is the probability of response pattern for the six observed variables representing women's empowerment dimensions; π_c is the proportion in latent class c; $P_{i|c}$ is the probability of response i to observed decision making variable conditional on membership

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in latent class c; $P_{j|c}$ is the probability of response j to observed control of resource variable conditional on membership in latent class c; and so on for all six observed dimension variables. We tried four possible number of classes, then selected the number of classes based on the Bayesian Information Criterion. The poLCA package [5] in R [9] was used to fit the model.

3   Results

Table 1 shows the frequencies and proportions of the women's empowerment dimension measures and the covariates. Over half of the women reported that they were involved in most decision making in the household. Sixty percent showed they had some control over resources. Less than a quarter of the women were mobile. About 86 percent of the women had participate in some civic activity, either by voting or participating in an community or NGO groups. About 38 percent of the women had above median gender equivalency score and 73 percent reported that they disagreed with spousal violence for any reason.

Three classes of women's empowerment status were identified based on the lowest Bayesian Information Criterion (BIC) value (See Figure 1). The estimated class conditional response probabilities are shown in Figure 2. The three classes can be described as follows:

- Class A: Control over home life, but low gender equivalent mindset;

- Class B: Control over home life and high gender equivalent mindset; and

- Class C: Little control over home life and low gender equivalent mindset.

Women in class A are more likely to have greater decision making roles in the household and have some control over resources. However, they are less likely to show gender equivalent

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Table 1: Frequency of observed women's empowerment dimension variables and select sociodemographic indicators among ever-married women aged 15-74, Matlab, Bangladesh, 2012

Dimensions/Covariates	Frequency	Proportion
Decision Making	3,452	0.59
Control of Resources	3,532	0.60
Mobility	1,391	0.24
Civic Participation	5,019	0.86
Gender Equivalence	2,204	0.38
Attitude toward Domestic Violence	4,310	0.73
Age		
15-19	170	0.03
20-24	725	0.12
25-29	885	0.15
30-34	799	0.14
35-39	679	0.12
40-44	536	0.09
45-49	537	0.09
50-54	465	0.08
55-59	344	0.06
60-64	282	0.05
65-69	262	0.04
70-74	185	0.03
Head of Household/Spouse of HH	4,054	0.69
Migrant Husband	2,163	0.37

attitudes. Class B women are highly likely to show gender equivalent attitude. They are also likely to have decision making roles in the household and have some control over resources. Hence, women in classes A and B can be considered as those who are more likely to have greater control over her life at home. However, women in class A are less likely to have gender equivalent mindset, while those in class B do. Women in class C are likely to have little control over her life at home nor are they likely to have gender equivalent attitude.

Approximately half (49.05 percent) of the women were estimated to be in class A, having control over home life, but displaying low gender equivalent attitude. The second
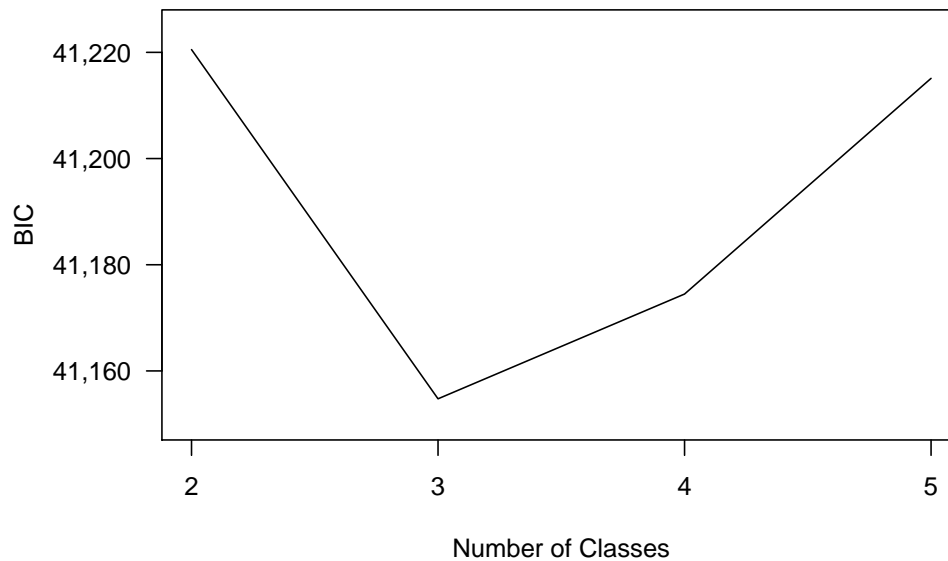
Figure 1: Comparison of BIC by the number of classes.

largest group was class C (31.70 percent), with little control over home life and low gender equivalent attitude. The smallest group was class B (19.25 percent), characterized by high gender equivalent attitude and having control over home life.

There is a strong age effect on class membership as can be seen in Figure 3. Class A and B memberships are low and class C membership is high at the two youngest age groups, indicating that women often do not have good control over their lives when young. The proportions of women in classes A and B increase in the middle age groups. The proportion of women in class C is lowest in the 40-44 age group. The proportion of women in class C increases again at higher age groups, with approximately half of the women in the 70-74 age group belonging to class C.

Estimated class membership differs substantially by whether the woman is the head of household or the spouse of the head of household (Figure 4). As expected, women who
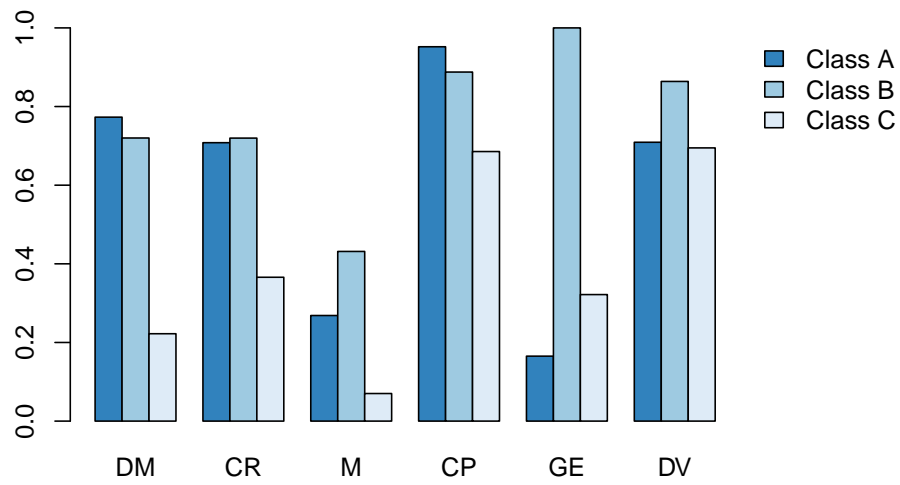
Figure 2: Estimated class conditional response probabilities. (DM=decision making, CR=control of resources, M=mobility, CP=civic participation, GE=gender equivalence, DV=domestic violence attitude)
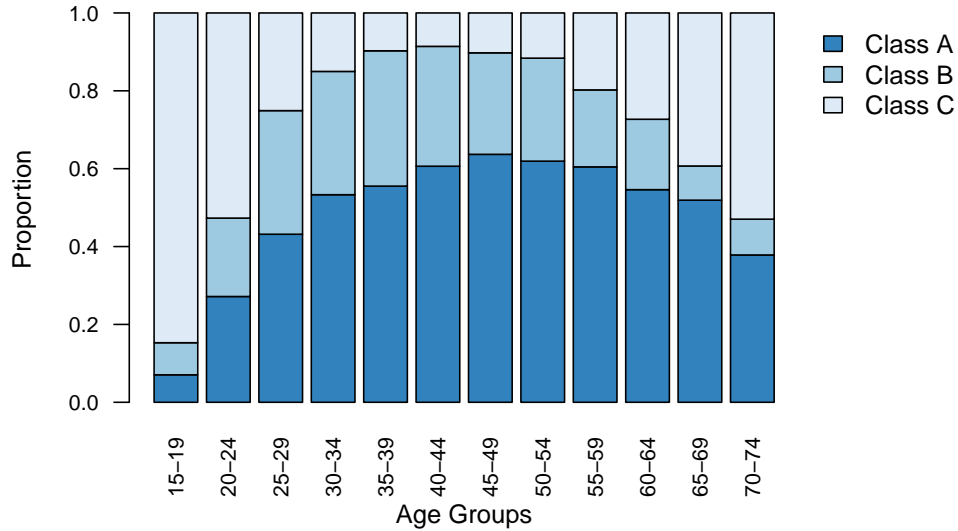
Figure 3: Class membership by age groups.

are heads of households or spouses of heads of households are more likely to be in class 1. Estimated class membership also differs by whether the woman has a migrant husband or not (Figure 5). A woman with a migrant husband is less likely to be in class A than a woman whose husband is present in the household. This is somewhat contrary to expectation, as a woman with a migrant husband may take on more household responsibilities, and therefore, may have better control over household decisions and resources. On the other hand, if a woman is more likely to live with her parents-in-law when her husband is away, then she would be less likely to belong to class A or B. When class membership was examined by both household position and presence of a husband in the household, we found that those who are heads of households or spouses of the heads of households were more likely to belong to class A or B regardless of the husband's presence in the household (Figure 6).
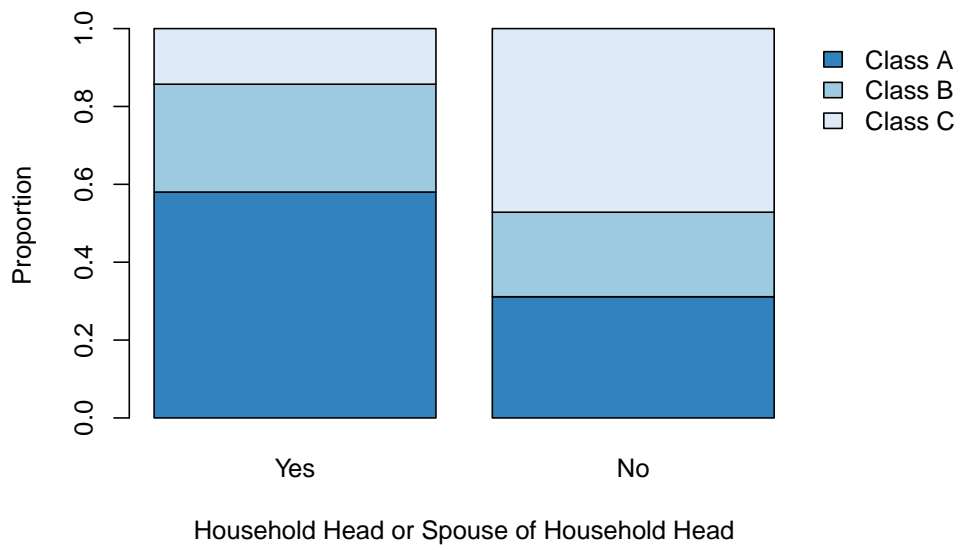
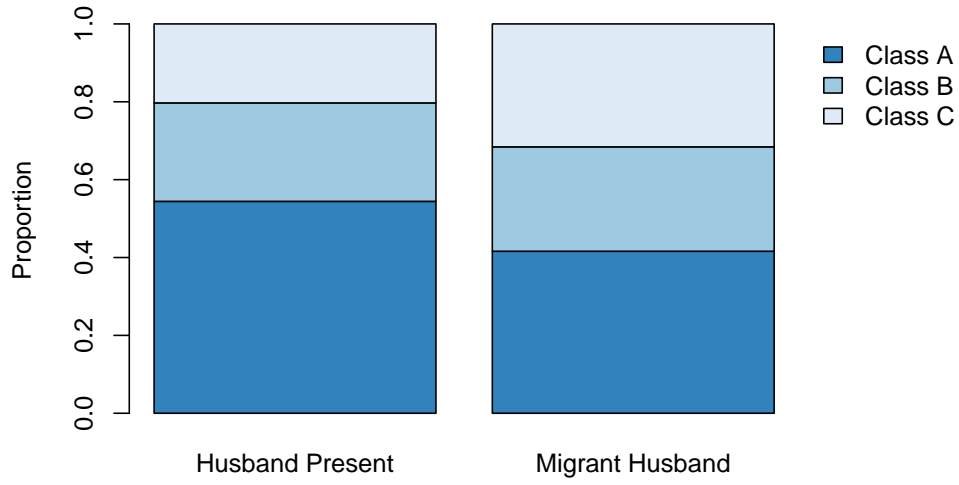Figure 4: Class membership by whether the respondent is a household head or the spouse of the household head.

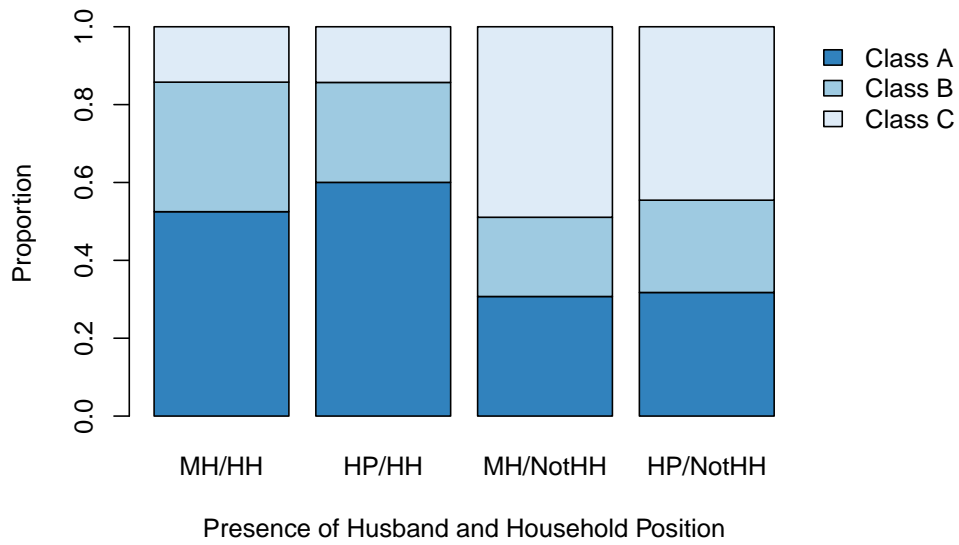Figure 5: Class membership by spouse presence.

Figure 6: Class membership by spouse presence and household position.

4 Conclusion

Latent class analysis is a useful technique that incorporates into a single analysis the various dimensions of women's empowerment to identify subgroups of women based on their response patterns. In the case of ever-married women between the ages of 15 to 74 in Matlab, Bangladesh, three classes of women's empowerment were found. Strong age patterns in class membership were observed. Whether a woman is the head of the household or the spouse of the head of household also mattered in class membership. Future research will investigate further the relationship between the women's empowerment measure and the covariates. In addition, we will examine data from the first wave of the dataset to determine how class membership may have changed over time.

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