Using Hierarchical Linear Modeling for Proformative Evaluation: A Case Example

Chris L. S. Coryn
The Evaluation Center—Western Michigan University

Proformative evaluation—first introduced in Scriven's (2006) *The great enigma: An evaluation design puzzle*—"is motivated, like formative evaluation, by the intention to improve something that is still developing, but unlike formative, the improvement is only possible by taking action, hence proactive instead of reactive*,* hence both, hence proformative" (M. Scriven, personal communication, March 9, 2006). An exploratory study was conducted to proformatively assess the effects of a pilot intervention intended to reduce negative attitudes toward the poor using a non-probability, convenience sample of 202 (149 women, 53 men) predominately White college students from a midsized Midwestern university. The study was conducted so that the program, prior to full-scale implementation, could be refined and more effectively designed. Hierarchical linear modeling was used to fit a two-level baseline (unconditional means) and growth model. The baseline model regressed the within individuals (nested) measures of attitudes toward the poor on time. The growth model regressed attitudes toward the poor on level two individual characteristics of gender, receipt of public assistance, race, and just-world beliefs.

Approximately 32.3 million persons (12.1%) in the United States live at or below the official poverty level (United States Bureau of the Census, 2002a). The average income deficit needed to raise poor families above the poverty threshold is $6,687 per family in the United States. Economic trends predict that the gap between the rich and poor will continue to widen. This economic disadvantage is especially great for certain ethnic and racial groups, and more so for households headed by single mothers (United States Bureau of the Census, 2000b). On virtually all indices of social and economic status among citizens of the United States, African Americans and other racial minorities fall below whites, and women fall below men. Income for the poor has remained relatively steady while upper level income continues to increase steadily. Unfortunately it is also these populations that tend to be seriously underrepresented in Census surveys (homelessness, transience), and therefore these estimates are not likely to provide an accurate representation of the poor population.

There has been surprisingly little research on attitudes toward poverty and the poor as a stigmatized or stereotyped group, despite the available data regarding attitudes and stereotypes toward other disadvantaged groups (e.g., ethnic/racial groups, gays and lesbians). Often these groups suffer stereotyping and/or social stigmas, and also tend to comprise the majority of the population living at or below federal poverty guidelines or lower levels of

living standard. For example, poverty rates in 1999 for Blacks were 23.6%, for Hispanics were 22.8%, for Asians (and Pacific Islanders) were 10.7%, and for single mothers an astounding 53% (United States Bureau of the Census, 2000a).

Prior research has shown that attitudes toward the poor in the United States tend to be negative (Cozzarelli, Wilkinson, & Tagler, 2001; Atherton, Gemmel, Hagenstad, Holt, Jensen, O'Hara, & Rehner, 1993). Studies have shown that reporting negative attitudes toward the poor are highly correlated with individualistic/internal attributions for poverty, and positive attitudes toward the poor have been reported as positively correlating with structural/external attributions for poverty (Bullock, Williams, & Limbert, 2001; Iyengar, 1990; Smith & Stone, 1989). Americans typically believe that individuals are responsible for their status in systems of social and economic inequality. There have been suggestions that poverty serves a societal purpose and is a necessary part of our social structure. Persons in low positions are kept there for the benefit of those in high positions (Gans, 1989). To eliminate the poor would be to eliminate the low-wage labor pool, physically dangerous work, temporary work, and undignified and menial jobs. Furthermore, attitudes toward poverty have been linked to the belief that the world is a just place where people deserve what they get (Furnham, 1982).

Lerner's belief in a just world theory presumes that persons either believe that the world is a just place and that people get what they deserve, or that the world is not a just place and that events occur by chance (Lerner, 1980). Those with high just-world beliefs attribute poverty and other negative circumstances to one's behavior and personal characteristics, concluding that the poor person somehow deserves to be poor. The person's economic status is due to something the person did or failed to do, therefore they deserve it or have it coming. Many studies have correlated just-

world beliefs with attributions and/or attitudes with some. Although some have questioned the reliability of the psychometric scales measuring just-world beliefs (Lea & Fekken, 1993; O'Conner, Morrison, & Morrison, 1993), most have shown statistically significant results using the measure. For example, Furnham (1993) reported that people having high just-world beliefs had more negative perceptions and attitudes toward the poor.

Belief in a just world scores have been significantly and positively correlated with authoritarianism, work ethic, conservatism, internal locus of control, and religious beliefs (Furnham, 1993). More importantly, in regards to this study, just-world beliefs have also been associated with perceptions of poverty, personal income, and reaction to personal deprivation. Furnham (1993) argued that the belief in a just world may exist in any society, particularly one in which there exist obvious inequalities. Those persons living in poverty tend to believe that the world is an unjust place. Lerner (1993) also reported that in more stratified societies (i.e., caste systems, class systems) unjust-world beliefs are higher than those in the United States.

The inequality between wealth and poverty is seen as the outcome of one's own behavior, wealthy people have earned their fortune and the poor have not. Previous studies have suggested several other variables (e.g., political affiliation, Protestant Ethic, authoritarianism) associated with high and low just-world beliefs (Coryn, 2002). Those with high beliefs in a just world would not support assistance programs (e.g., welfare, food stamps, TANF) that would provide relief for the poor. According to Lerner's theory (1982), people with high just-world beliefs believed that the opportunity to get ahead is available to all, and that one's own actions cause poverty. Therefore, social programs only serve to justify poor people's behavior.

Furnham (1993) reported that some people believe in a just world because of their personal

pathology and experiences (individual functionalism), but there is strong evidence that just-world beliefs are a function not only of personal experience, but also of societal functionalism (i.e., a country's structural and societal factors). Just-world beliefs held by the rich and powerful condemn or devalue the poor. A sociological view suggests the poor serve several functions for the rest of society, and the more affluent have no true desire to address the issues of poverty. Gans (1999) suggested that the poor are exploited in a number of ways (e.g., a low-wage labor pool, guarantee the status of those who are not poor, absorb the costs of change and growth in American society, etc.). Elimination of poverty would prove costly and be met with resistance. It is believed that economic inequality is inevitable in a capitalist society, and the wealthy contribute to the economy in ways that are beneficial for all.

Research pertaining to poverty and attitudes toward the poor could serve as a catalyst for public policy, education, healthcare, and various other issues concerning this population. Poverty continues to be a significant problem in the United States and globally, yet the poor are apt to be devalued and marginalized. Minority group members are objectively worse off than they would be if stereotypes and prejudice did not exist. They suffer psychologically, economically, and physically. Attitudes form quickly and easily, yet resist change. More importantly, the poor are often the victims of categorization, viewed as the social out-group, and perceived as homogenous; they are all the same (e.g., lazy, immoral, promiscuous).

The Case: An Information Intervention

The information intervention was conducted as part of a beta-test for developing a community initiative to reduce negative attitudes and stereotypes toward the poor and ultimately with the intent of raising community awareness and activism. Two psychologists—a social psychologist and a community psychologist—were hired as consultants, who developed the content and curricula of the intervention in partnership with the psychology department of a midsized Midwestern university. In the initial pilot, four sessions of 90 minutes in duration were held. Two hundred-fourteen students volunteered to participate in the pilot. These volunteers received course credit for participating in the pilot intervention. In each of the sessions participants listened to brief lectures, participated in interactive discussions and activities, and were given materials associated with the lecture, about the causes, consequences, and general nature of poverty and asked to complete short in-class and take-home assignments. The results of this study were used to proformatively evaluate the efficacy of the pilot and to provide useful information for making refinements and improvements to the intervention prior to full-scale implementation in the community; that is, to take action based on proformative evaluation information.

It was hypothesized that the exposure to information intervention about poverty would, over time, lower negative attitudes toward the poor. Specifically it was anticipated that women, minorities, and persons who reported receiving some form of public assistance would report less negative attitudes toward the poor initially (at time 1) and that women, minorities, and persons who reported receiving some form of public assistance would experience a statistically significant decrease (downward growth trajectory) in negative attitudes over the 4 time periods, while those who initially (at time 1) reported high-levels of belief in a just world (i.e., people get what they deserve) would not experience a statistically significant decrease in negative attitudes toward the poor over the 4 time periods.

Method

Sample and Participants

A non-probability convenience sample of 202 undergraduate students (149 women, 53 men) enrolled in introductory psychology courses at midsized Midwestern university volunteered to participate in this study in order to partially fulfill an introductory psychology course requirement. Eighty-two percent of respondents were White/Caucasian, 9.4% were Black/African American, 3.0% were Asian, 3.0% were Hispanic, and 2.0% self-identified as "other". Sixty-five percent of participants reported no personal history of public assistance (e.g., food stamps, welfare, or housing subsidies), while 34.7% reported some history of public assistance. A total of 12 participants (6%) failed to attend one or more of the sessions and were not included in these analyses.

Materials

Participants were to report for four sessions over a six-month period, at approximately six-week intervals. In the first session participants were asked to complete a packet of questionnaires. The first part of the questionnaire asked sociodemographic questions (gender, age, ethnicity, and public assistance history). The second questionnaire was Rubin and Peplau's 20-item belief in a just world scale (Rubin, & Peplau, 1973). The last questionnaire was a 37-item attitudes toward the poor questionnaire (Atherton et al., 1993). With the exception of the demographic questionnaire, all questionnaires employed five-point Likert scales. Participants rated their level of agreement from 1 (strongly disagree) to 5 (strongly agree).

In each of the sessions participants were to listen to brief lectures [i.e., the intervention] (from the researcher conducting the study, personnel from local programs which serve poor populations, and persons who received services from these programs), participate in interactive discussions and activities, and were given photocopied materials associated with the lecture, about the causes, consequences, and general nature of poverty. Each session lasted approximately 60 minutes. Following each lecture participants were then asked to complete the 37-item attitudes toward the poor questionnaire.

Measures

Individual Measures

Participants completed the sociodemographic questionnaire at the first intervention session, including information on their gender, public assistance history, race, and just-world beliefs.

Gender. Gender was dummy-coded (scaled 1-0), with 1 indicating female for these analyses.

Public assistance. Participants were asked whether or not they or anyone in their immediate family had ever received public assistance (e.g., housing subsidy, TANF, food stamps). The public assistance variable was dummy-coded (scaled 1-0), with 1 indicating receipt of public assistance. Thirty-four percent of participants reported that either they or a member of their family had at some time received some form of public assistance.

Race. Race was dummy-coded (scaled 1-0), with 1 indicating minority (e.g., African American, Hispanic) for these analyses.

Belief in a just world. Rubin and Peplau's belief in a just world scale is intended to measure to what extent one believes that the world is a just and fair place where one gets what one deserves. High scorers on this scale have been found to denigrate and blame innocent victims for their plight (Rubin & Peplau, 1973). Twenty statements (e.g., good deeds often go unnoticed and unrewarded, people who meet with misfortune often have brought on themselves) were used to measure the degree to which individuals endorse the belief in a just world. For these analysis the total of the 20 items, ranging from 20-100 ($M = 60.02$, $SD = 14.61$), was utilized.

Within Individuals Measures

The outcome variable, attitudes toward the poor, was measured at each of the four intervention stages, thus the outcome variable was nested within individuals.

Attitudes toward the poor. Attitudes toward the poor were assessed using the 37-item scale developed by Atherton, Gemmel, Haagenstad, Holt, Jensen, O'Hara, and Rehner (1993), with higher scores indicating negative attitudes. The attitudes toward the poor questionnaire contained statements that reflected both positive (e.g., poor people are discriminated against) and negative (e.g., poor people create their own difficulties) attitudes toward the poor. Positive items were reverse scored. For these analyses the total of the 37 items, ranging from 37-185 (Time 1, $M = 114.12$, $SD = 26.40$; Time 2, $M = 103.97$, $SD = 25.37$; Time 3, $M = 94.42$, $SD = 24.16$; Time 4, $M = 83.07$, $SD = 21.55$) was utilized.

Analytic Strategy

The hierarchical linear modeling (HLM) program was used to fit a two-level baseline (unconditional means) and growth model. The baseline model regressed the within individuals (nested) measures of attitudes toward the poor (ATTP) on time (TIME). The growth model regressed ATTP on level two individual characteristics; gender (GENDER), public assistance (ASST), race (RACE), and just-world beliefs (JWB). Thus, the baseline model was expressed as:

Level 1 Model
$$y = \beta_0 + \beta_1(\text{TIME}) + r$$
Level 2 Model
$$\beta_0 = y_{00} + u_0$$
$$\beta_1 = y_{10} + u_1$$

While the growth model (with level two individual characteristic terms added) was expressed as:

Level 1 Model
$$y = \beta_0 + \beta_1(\text{TIME}) + r$$
Level 2 Model
$$\beta_0 = y_{00} + y_{01}(\text{GENDER}) + y_{02}(\text{ASSIST}) + y_{03}(\text{RACE}) + y_{04}(\text{JWB}) + u_0$$

$$\beta_1 = y_{10} + y_{11}(\text{GENDER}) + y_{12}(\text{ASSIST}) + y_{13}(\text{RACE}) + y_{14}(\text{JWB}) + u_1$$

Data Screening and Diagnostics

Two data files were used for the analysis; one with the repeated measures of ATTP within individuals and the other with individual characteristics. The two data files were matched by a unique ID for each participant. A .mdm file was created in the HLM program and was used to generate the HLM analyses and residual files for diagnostic analyses.

Data were screened and diagnosed at three levels; level 1, level 2, and across levels. Level 1 diagnostics indicated no extreme multicollinearity (all correlations were <.15), violations of normality (Shapiro-Wilk = .56), or heterogeneity of variance (Levene's = .33). Diagnostics at level 2 indicated no violations of normality (Shapiro-Wilk = .47 and .23), homoskedasticity ($p = .34$, $p = .23$), independence of residual vectors (no significant or large correlations), or correlations between level 2 residuals and predictors (no significant or large correlations). Cross-level diagnostics indicated no severe violations of collinearity (no significant or large correlations between level 1 predictors and level 2 residuals, level 2 predictors and level 1 residuals, or level 1 and level 2 residuals), thus the model was assessed as being correctly specified.

Analysis and Results

Baseline Model

Assessment of the baseline model indicated that there were significant differences in initial status and growth rates between participants ($p < .000$), without any of the individual characteristic variables entered. Moreover, 97.2% of the variation in attitudes toward the poor (ATTP) was in initial status, while 2.8% of the variation was in the growth rate between students (see Table 1). Therefore, most of the variation was in initial attitudes between students, with only a small amount of variation in growth rates between students.

Table 1
Baseline Model Variance Components

	SD	Variance Component	*df*	X^2	*p*
INTRCPT1, U_0	29.75	885.32	201	4508.95	0.00
TIME slope, U_1	5.04	25.41	201	1128.36	0.00

Growth Model

For the growth model 26.4% of the variation in growth rates between students was explained by the variables in the model [gender (GENDER), public assistance (ASSIST), race (RACE), and just-world beliefs (JWB)], while 95.2% of the variation was in initial status (see Table 2). Table 3 presents the effects of the variables on initial status as well as the growth trajectory. As was anticipated, persons who reported receiving some form of public assistance (ASSIST) had significa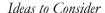ntly less negative ATTP at time 1 and a marginally significant downward growth trajectory (decreased at a faster rate). Strangely though, both women (GENDER) and minorities (RACE) reported significantly more negative ATTP at time 1, yet both had significant downward growth trajectories ($p = .002$ and .003 respectively). Finally, those who had stronger just-world beliefs (JWB) at time 1 tended to have significantly less negative ATTP, yet, as can be seen by the significant slope ($p > .000$) these persons negative attitudes tended to increase over time.

Table 2
Growth Model Variance Components

	SD	Variance Component	*df*	X^2	*p*
INTRCPT1, U_0	19.33	373.69	197	1979.17	0.00
TIME slope, U_1	4.32	18.70	197	865.98	0.00

Table 3
Summary of Effects

	Coefficient	*SE*	T-Ratio	*df*	*p*
INTRCPT1, β_0					
INTRCPT2, G_{00}	206.87	7.28	28.40	197	0.00
GENDER, G_{01}	8.27	3.34	2.47	197	0.01
ASSIST, G_{02}	-5.88	3.20	-1.80	197	0.06
RACE, G_{03}	7.59	4.02	1.88	197	0.06
JWB, G_{04}	-1.40	0.10	-14.20	197	0.00
INDEX1 slope, β_1					
INTRCPT2, G_{10}	-15.79	1.75	-8.97	197	0.00
GENDER, G_{11}	-2.66	0.80	-3.30	197	0.00
ASSIST, G_{12}	-0.29	0.77	-0.37	197	0.70
RACE, G_{13}	-2.98	0.97	-3.07	197	0.00
JWB, G_{14}	0.13	0.02	5.61	197	0.00

Concluding Remarks

With the individual characteristics added to the model the variation in initial status was slightly less (95.2%) than the variance accounted for in initial status by the baseline model (97.2%), indicating that these characteristics accounted for a small amount of this variation. Moreover, only 2.8% of the variation in growth rates over time between participants was explained by the baseline model, while 26.4% of the variation in growth rates over time was explained by entering the individual characteristics.

Most interesting were the differences in initial status, that is, both women and minorities reported more negative ATTP, while persons having higher JWB reported slightly less negative ATTP initially. Although the growth trajectories over time supported the posited hypothesis, the hypothesis for initial status was not supported (i.e., that women and minorities would report less negative ATTP at time 1). In part, these anomalies may be due in part to women and minorities negative attributions for poverty. That is, women and minorities may attribute poverty to individual characteristics, yet despite the anomalies in initial status, the intervention was successful in reducing these persons negative ATTP over time.

Due to the relatively low age of participants ($M = 19.7$), participants may have simply underestimated the extent to which variables such as low paying jobs with no benefits are significant barriers for many poor persons. Cozzarelli, Wilkinson, and Tagler (2001) reported that younger persons, who may not have not yet worked to support themselves, are more likely to hold negative attitudes toward persons living in poverty.

Clearly this study suffered from certain limitations. Firstly, the majority of participants were White, young, college students who generally reported that neither they nor their immediate family had a history of receiving public assistance (e.g., welfare, TANF, food stamps, or a housing subsidy). Cozzarelli, Wilkinson, and Tagler (2001) reported that age is significantly related to the attributions one makes for poverty and wealth. In particular more research is needed to assess the content (i.e., affective, cognitive, and behavioral) of attitudes toward the poor, rather than simply evaluating degrees of favor or disfavor.

Current systems tend to disadvantage the poor, and the economic disparity continues to widen. Historically, programs that have been designed to serve the poor (e.g., welfare, TANF, the Workforce Investment Act) have been ineffective, and serve to reinforce the negative stereotypes and attitudes toward the poor. Debate continues regarding welfare reform and legislation that would establish time limits for those receiving public assistance. A portion of the population of the United States consider social service and public assistance programs created to assist the poor as a waste of taxpayer money, and regard the poor as a burden to society. Negative attitudes and stereotypes lead to negative behaviors against members of disliked groups. And while legislation may create laws that require equal opportunity for employment, housing, and other factors, legislation will never eliminate prejudice and cannot make people think or feel what we want them to.

Proformative evaluation has not been fully conceptualized, developed, or demonstrated, and it has yet to be logically distinguished from program planning and design—and, this study is not itself a significant move in that direction, but it does provide a sense of how evaluation can lend itself to improvement through action. However, one thing is clear: whether for planning or design, conducted internally or externally, proformative evaluation has the capacity to save valuable resources (e.g., time, effort, money) by providing useful

(pro)formative feedback to evaluands (e.g., will the program work?) and in giving designers and developers adequate information to be proactive versus reactive (Scriven, 2006) (e.g., it is easier to make modifications in the design stage than it is in a mature program). Unlike true formative evaluation, proformative evaluation need not consider all of the relevant and demonstrable merit-defining criteria for a program of a certain class or type, nor all of the core dimensions of evaluation (i.e., process, outcomes, costs, comparisons, generalizability), in its aim to improve an evaluand. By default, it has its value and appeal in its prospective nature (i.e., predictive value claims); that is, what is likely that the program will or can do?

References

Atherton, R. A., Gemmel, R. J., Haagenstad, S., Holt, D. J., Jensen, L. A., O'Hara, D. F., & Rehner, T. A. (1993). Measuring attitudes toward poverty: A new scale. *Social Work Research Abstracts, 29*(4), 28-30.

Bullock, H. E., Williams, W. R., & Limbert, W. M. (2001, August). *Attributions, beliefs about inequality, and support for progressive welfare policies.* Poster session presented at the annual convention of the American Psychological Association, San Francisco, CA.

Bullock, H. E. (1999). Attributions for poverty: A comparison of middle-class and welfare recipient attitudes. *Journal of Applied Social Psychology, 29*(10), 2059-2082.

Coryn, C. L. S. (2002). Antecedents of attitudes toward the poor. *Indiana University South Bend Undergraduate Research Journal, 5*, 13-19.

Cozzarelli, C., Wilkinson, A.V., & Tagler, M. J. (2001). Attitudes toward the poor and attributions for poverty. *Journal of Social Issues, 57*(2), 207-227.

Furnham, A. (1993). Just world beliefs in twelve societies. *Journal of Social Psychology, 133*(3), 317-330.

Furnham, A. (1982). Why are the poor always with us? Explanations for poverty in Great Britain. *British Journal of Social Psychology, 21,* 311-322.

Gans, H. G. (1999). The uses of poverty: The poor pay all. *Making sense of America: sociological analysis and essays* (pp. 219-224). Lanham, MD: Rowman & Littlefield.

Iyengar, S. (1990). Framing responsibility for political issues: The case of poverty. *Political Behavior, 12*(1), 19-40.

Lea, J. A., & Fekken, C. G. (1993). Toward an improved just world measure: Can a reliable subscale be salvaged? *Journal of Social Psychology, 133*(6), 873-874.

Lerner, M. J. (1980). *The belief in a just world: A fundamental delusion.* New York, NY: Plenum Press.

O'Conner, W. E., Morrison, T. G., & Morrison, M. A. (1996). The reliability and factor structure of the global belief in a just world scale. *The Journal of Social Psychology, 136*(5), 667-668.

Rubin, Z., & Paplau, L. A. (1973). Belief in a just world and reactions to another's lot: A study of participants in a national draft lottery. *Journal of Social Issues, 29,* 73-93.

Scriven, M. (2006). *The great enigma: An evaluation design puzzle.* Unpublished manuscript.

Singh, A. K. (1989). Attribution research on poverty: A review. *Psychologia, 32,* 143-148.

Smith, K. B., & Stone, L. H. (1989). Rags, riches, and bootstraps: Beliefs about the causes of wealth and poverty. *The Sociological Quarterly, 30*(1), 93-107.

United States Bureau of the Census (2000a). *Poverty: 1999 highlights.* Retrieved March 19, 2006 from http://www.census.gov/hhes/poverty/poverty99/pov99hi.http

United States Bureau of the Census (2000b). *Poverty in the United States: Current population reports; Consumer income.* Retrieved March 19, 2006 from http://www.census.gov.http