Social-Psychological Predictors of Interest in the CDC's National Diabetes Prevention Program

Daniel Reich, B.A. Psychology
Catalyst Behavioral Sciences

Background Information

Findings from the Centers for Disease Control and Prevention (CDC) have shown that there are significantly different patterns of enrollment in their National Diabetes Prevention Program (DPP) for different demographic sub-groups of prediabetic Americans. Notably, this includes decreased interest from younger individuals, racial minorities, and males. However, demographic variables alone cannot fully explain why some people are interested in the program and why others are not. In order to address these discrepancies, Catalyst Behavioral Sciences administered two large empirical studies of enrollment and retention in the DPP. For the sake of brevity, the present work examines just a small fragment of the overall study. Here, I will examine the roles that a variety of social-psychological factors play in increasing or decreasing the odds of participants being interested in the program. These factors include intentions to take action, perceived norms about health and diabetes, perceived effectiveness of behavior change, perceived barriers to change, perceived effectiveness of self-regulation, and knowledge of prediabetes. The goal of this study is to determine what social-psychological factors significantly predict interest in enrolling in the DPP with the hope that these findings can be used to improve current intervention and outreach methods.

Variables of Interest

I analyze the influence of seven distinct factors on interest in the CDC's Diabetes Prevention Program: (1) intentions to take action, perceived norms about (2) health and (3) diabetes, (4) perceived effectiveness of behavior change, (5) perceived barriers to change, (6) perceived effectiveness of self-regulation, and (7) knowledge of prediabetes. Example survey questions contributing to each factor are included below.

Example Questions For Variables of Interest	
Intentions	I intend to take action to address my prediabetes by eating healthier
Diabetes norms	Many people I know probably have prediabetes
Health norms	Many people I know eat healthy
Effect of behavior on outcome	Effectiveness of Changing your eating to eat more healthy foods (like fruits and vegetables) and less unhealthy foods (like chips and cookies)
Effectiveness of self-regulation	Potential effectiveness of Structuring my living environment to make healthy changes easier (for example, removing unhealthy foods from my house, setting a regular time and place to exercise)
Barriers to change	If I started eating healthier and exercising more, I would no longer fit in with the people I live and socialize with
Knowledge of prediabetes	I have a good understanding of prediabetes
Food habits	Buying fast food less often or not at all would be difficult for me
Exercise habits	Exercising is something that I do often without really thinking

Model Selection

In order to determine which factors are most strongly correlated with higher interest in the National Diabetes Prevention Program, I utilize least absolute shrinkage and selection operator (LASSO) regularization and Logistic Regression. I include race, ethnicity, gender, and age as controls, as these factors have been shown to be strongly correlated with interest/enrollment in the DPP.

LASSO regularization determined that the best lamda value was 0.036 (Figure 1). This results in the retention of 5 variables (shown in Table 1.)

The model with LASSO regularization performs significantly better (BIC = 2024.84) than the model that retains all predictors (BIC = 4053.19).

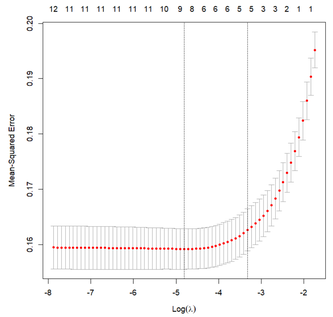

Figure 1. Parameter Selection for LASSO Model

Coefficients	Estimate	SD	P-value
Intercept	-7.045	0.360	<.0001
int	0.752	0.069	<.0001
eff_sreg	0.168	0.045	<.0001
beh_out	0.347	0.064	<.0001
diab_norm	0.144	0.043	<.0001
food_habit	0.185	0.041	<.0001

Table 1. LASSO Model Logistic Regression Output

Model Performance

I utilize LASSO regularization and logistic regression in order to determine the most parsimonious model while maintaining a low misclassification rate. My model shows that we can accurately predict high interest in the National DPP (Sensitivity = 0.78, Specificity = 0.71, Figure 2.) using only a few predictors. These findings could help direct targeted outreach efforts to individuals more likely to enroll in these programs.

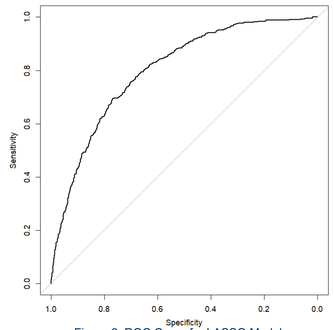

Figure 2. ROC Curve for LASSO Model

Acknowledgments:
This poster would not have been possible without funding from the Centers for Disease Control and Prevention and Catalyst Behavioral Sciences. I would like to thank David Neal and the rest of my friends at Catalyst Behavioral Sciences for providing me with the opportunity to present this work.

daniel@catalystbehavioral.com
catalystbehavioral.com
linkedin.com/in/dpreich/

CATALYST BEHAVIORAL SCIENCES

Predicted Probabilities

I analyze the effects of each of the five retained predictors independently using predicted probability plots, controlling for the other factors and demographic variables by holding them at their means. Here, we see that intentions to act on one's prediabetes has the strongest effect on interest in the DPP. However, one's perceptions about health, self-regulation, barriers to change, and normative behaviors also have significant effects on interest in the program. Predictor variables are rescaled from 0 to 1 to aid interpretation.