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### Title

A Spanish-Language Risk Perception Survey for Developing Diabetes: Translation Process and Assessment of Psychometric Properties.

### Permalink

<https://escholarship.org/uc/item/1tn1381k>

### Journal

Journal of nursing measurement, 24(3)

### ISSN

1061-3749

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### Publication Date

2016-12-01

### DOI

10.1891/1061-3749.24.3.365

Peer reviewed



# HHS Public Access

Author manuscript

*J Nurs Meas.* Author manuscript; available in PMC 2017 December 01.

Published in final edited form as:

*J Nurs Meas.* 2016 December 01; 24(3): 365–378. doi:10.1891/1061-3749.24.3.365.

## A Spanish-Language Risk Perception Survey for Developing Diabetes: Translation Process and Assessment of Psychometric Properties

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### Abstract

**Background and Purpose**—Create a Spanish-language version of the Risk Perception Survey for Developing Diabetes (RPS-DD) and assess psychometric properties.

**Research Design and Methods**—The Spanish-language version was created through translation, harmonization, and presentation to the tool's original author. It was field tested in a foreign-born Latino sample and properties evaluated in principal components analysis.

**Results**—Personal Control, Optimistic Bias, and Worry multi-item Likert subscale responses did not cluster together. A clean solution was obtained after removing two Personal Control subscale items. Neither the Personal Disease Risk scale nor the Environmental Health Risk scale responses loaded onto single factors. Reliabilities ranged from .54 to .88. Test of knowledge performance varied by item.

**Conclusions**—This study contributes to evidence of validation of a Spanish-language RPS-DD in foreign-born Latinos.

It is estimated that 29 million adults in the United States (US) have diabetes, and another 86 million have prediabetes, a high-risk state for developing diabetes (Centers for Disease Control and Prevention, 2014). Diabetes can lead to devastating health complications for individuals, and the costs associated with diabetes are unsustainable for society (Dall et al., 2014). Type 2 diabetes mellitus (T2DM), comprising 90-95% of all diabetes, can be delayed or prevented in adults at high-risk for developing diabetes, irrespective of ethnic/racial background (Knowler et al., 2002). Public health leaders recommend evaluation of risk for developing T2DM of all US adults by healthcare providers in clinical settings, and referral of those found to be at high-risk for developing T2DM to community-based T2DM prevention programs (Green, Brancati, Albright, & Primary Prevention of Diabetes Working, 2012). Deployment of public health T2DM prevention campaigns and programs into communities is underway nationwide (Albright & Gregg, 2013).

Special attention is needed to promote uptake of strategies for primary prevention of T2DM in adults belonging to groups vulnerable to receiving inadequate preventative health services (Green et al., 2012). Latino adults in the US are disproportionately impacted by diabetes. Compared to non-Latino white adults, Latino adults in the US are more likely to be diagnosed with diabetes, diagnosed with end-stage renal disease (a severe chronic complication of diabetes), and die from diabetes (US Department of Health and Human Services Office of Minority Health, 2014). Low levels of English proficiency, a factor associated with vulnerability to receiving inadequate preventative health services (Derose, Escarce, & Lurie, 2007), are common in Latino adults living in the US who are foreign-born (US Census Bureau, 2013). The largest group of US Latino adults with lower levels of English-language proficiency, are foreign-born from Mexico and Central America that speak predominately Spanish at home (Pew Research Center, 2014; US Census Bureau, 2013).

Perception of risk for developing diabetes is believed to be a key factor in the engagement of adults at increased risk in T2DM primary prevention efforts (Downs, de Bruin, Fischhoff, & Walker, 2010; Fisher et al., 2002; Harwell et al., 2001). Perception of risk for developing diabetes and factors modifying perception of risk have been measured in the published Risk Perception Survey for Developing Diabetes questionnaire (RPS-DD) (Walker, Mertz, Kalten, & Flynn, 2003). The English-language RPS-DD is available on the website of the author (<https://www.einstein.yu.edu/centers/diabetes-research/research-areas/survey-instruments.aspx>). Although a Spanish-language translation of the RPS-DD is also available on this website, there is no published evidence of its validation in Latino adults.

Based on these considerations, a new Spanish-language translation of the RPS-DD and evaluation of its psychometric measurement properties in Latino foreign-born adults living in the US is warranted. The aims of this study were to 1) translate the RPS-DD from English into Spanish; and (2) conduct a field test in a sample of Latino foreign-born adults living in the San Francisco Bay Area in Northern California to 2a) assess the psychometric measurement properties of the multi-item Likert subscales and scales; and 2b) assess performance of the risk factor knowledge test contained in the new Spanish-language RPS-DD.

## Characteristics of the Original English-language RPS-DD

The original English-language RPS-DD consists of a four-page questionnaire with four separate sections. The first section, intended to measure three unique general attitudes that may modify perception of risk for developing diabetes, consists of a multi-item Likert scale containing three subscales: 1) the Personal Control subscale (4 items), 2) the Optimistic Bias subscale (2 items), and 3) the Worry subscale (2 items). In this section of the RPS-DD, the items are presented as statements of general attitudes. The Likert response options are levels of agreement with the statements of general attitudes, presented from the highest level of agreement, to the lowest: “Strongly Agree”, “Agree”, “Disagree”, and “Strongly Disagree”. Notably, the Personal Control subscale contains two non-reversed and two reversed items.

The second and third sections of the questionnaire consist of two multi-item Likert scales intended to measure the larger context of perceived risk to health that respondents are theorized to have. In the second section, there is a 15-item Likert scale, identified as the Personal Disease Risk scale, intended to measure perception of risk to health of 15 separate chronic health conditions and diseases (one of which is diabetes). The response options are levels of perceived risk to health, presented from the lowest level, to the highest: “Almost No Risk”, “Slight Risk”, “Moderate Risk”, and “High Risk”. Thus, perceived risk of diabetes is one of the items embedded within the Personal Disease Risk scale. Also included in the Personal Disease Risk scale are items measuring perception of risk to health of other chronic health conditions and diseases including: chronic complications of diabetes, chronic diseases associated with diabetes, and other diseases not associated with diabetes. For each condition, in addition to selecting a level of perceived risk to health, respondents are instructed to indicate whether they and/or a family member have or have had that condition. Formatted in a similar manner, the third section, identified as the Environmental Health Risk scale, measures perceptions of risk to health of nine environmental health hazards. The Environmental Health Risk scale covers perceptions of risk to health over a wide range of hazards including: medical x-rays, violent crime, extreme weather, driving/riding in an automobile, illegal drugs, air pollution, pesticides, household chemicals, and second-hand smoke.

The response options of the individual items in the first three sections of the RPS-DD questionnaire are assigned a numerical value from 1 to 4. The multi-item Likert subscales and scales are scored as averages of these items. The scoring is reversed for 2 of the 4 items in the Personal Control subscale, the 2 items in the Optimistic Bias subscale, and the 2 items in the Worry subscale prior to interpretation to account for the direction of the items. The scores of the Personal Control, Optimistic Bias, and Worry subscales are thus interpreted with higher scores indicating a higher level of the assessed underlying construct, more personal control, more optimistic bias, and more worry, respectfully. In the Personal Disease Risk scale if the respondent indicated that they or a family member have or have had the disease or condition, an additional point is added to the item value. Interpretation of the scores is similar for the Personal Disease Risk scale and the Environmental Health Risk scale, with higher scale scores reflecting greater degrees of perceived comparative personal disease risks, and perceived comparative environmental risks, respectively.

The fourth section of the RPS-DD is a test of knowledge of risk factors for developing diabetes. The items in the test of knowledge are presented as a list. The responses options are: “Increases the Risk”, “Has NO Effect on Risk”, and “Decreases the Risk”. Respondents are also given the option “Don't Know”. Of the 11 items, three assess knowledge of the benefits of modifiable lifestyle factors: healthful diet, physical activity, and control of body weight. The remaining eight items assess non-modifiable risk factors. Five of the items that assess non-modifiable risk factors assess knowledge of the effect on risk for developing diabetes of different races and ethnicities including: being African American, being American Indian, being Asian American, being Caucasian, and being Hispanic. The items are dichotomously scored, correct/incorrect, and the number of correct responses is tallied with a possible score of 1-11. A higher score is interpreted as being more knowledgeable of risk factors for developing diabetes.

## Design and Methods

The study consisted of 2 phases, creation of a new Spanish-language RPS-DD and field-testing in a cross-sectional survey. In the first phase, a new Spanish-language RPS-DD was created by a team led by a US-born non-Latino nurse researcher (KJ), a foreign-born Latino nurse researcher from Chile (RMS), and a foreign-born Latino experienced translator from Mexico (EB). In the second phase, evidence of the psychometric measurement performance of the new Spanish-language RPS-DD was acquired in a cross-sectional study with a sample of 146 Spanish-speaking foreign-born Latino adults living in the US. Permission was granted by the author of the English-language RPS-DD to use the new Spanish-language translation for this field-testing (personal communication).

## The new Spanish RPS-DD

The process for creating the new Spanish-language translation of the RPS-DD involved a number of steps: 1) creation of a new preliminary Spanish-language version by a member of the translation team (EB); 2) obtainment of the existing (untested) Spanish- translation created by the RPS-DD author; 3) harmonization of these two Spanish- versions; 4) focus group testing of the harmonized version; 5) modification of the harmonized version based on focus group results and other information to create a translation for presentation to the RPS-DD author; 6) back translation to English of the modified version for presentation to the RPS-DD author; and 7) consultation of the team with the RPS-DD author to create the version for field testing.

The first step was the creation of a new Spanish-language preliminary version of the RPS-DD, forward-translated by a member of the translation team who is an experienced-translator, Latino, and foreign-born from Mexico (EB). Concurrently the existing untested Spanish-language forward-translation of the RPS-DD was obtained from the website of the RPS-DD author. Harmonization (Wild et al., 2005) by the translation team of these two English-to-Spanish forward-translated versions resulted in the creation of a new Spanish version for presentation to a focus group.

Next a focus group was conducted to elicit feedback on the harmonized version with a group of Latino Spanish-speaking community health workers (N=11) experienced in delivering preventative health services to US Latino adults foreign-born from Mexico and Central America. The focus group session took place in May 2014 in the San Francisco Bay Area in Northern California. Participants received a \$20 gift card for their time. The average age of the focus group participants was 48 (SD 2.6) years. Of the 11 participants, six were women and five, men. Eight of the participants reported speaking predominately Spanish at home. Nine were US adults foreign-born from Mexico, one was foreign-born from a Central American country, and one was foreign-born from a South American country. All but one of the participants, were high school graduates, five had attended some college, and three were college graduates or had advanced college degrees. Family incomes reported by participants ranged from less than \$10,000/year, to between \$50,000/year and \$75,000/year. Four participants reported a medical history of diabetes.

Members of the focus group repeatedly verbalized that one of the key considerations in translating the RPS-DD was anticipation of a high prevalence in the target population of low levels of educational attainment, a proxy for low health literacy. Such persons may experience difficulty comprehending the meaning of items that require challenging cognitive operations to formulate responses. Particular concern was expressed by multiple members regarding the challenging cognitive operations required to respond to one of the items in the Personal Control subscale. Members noted that the item required participants to conceptualize the concept of “control”, which could mean different things to different respondents, leading to a high probability of misresponse. This specific item also differed from 2 other items in the subscale in that it was one of the two reversed items, which added to the complexity by requiring participants to choose a response option from the other end of the Likert scale.

Independent from the translation team, one of the focus group members expressed a preference for presenting the multi-item Likert response options in consistent order throughout the questionnaire from highest to lowest. The rationale, confirmed by other members, was that presentation in this order is what adults in the target population would expect when completing the questionnaire.

The focus group feedback was then incorporated into a version of the translation for presentation to the RPS-DD author. At this point, the team made a number of formatting changes. One change was done to decrease the number of cognitive operations required to formulate responses in items of two versions of the questionnaire; one for men and one for women. In the English-language RPS-DD respondents are asked to compare their risk for developing diabetes to that of other individuals of the same “sex” in the statements in these items. These statements were changed so that in the version for men, male respondents were asked to compare their risk for developing diabetes to that of other men, and in the version for women, female respondents were asked to compare their risk for developing diabetes to that of other women.

Another formatting change made, based on the findings of the focus group as well as reported findings from an unpublished study by a member of the translation team (RMS),

was the reordering of the Likert response options in the Personal Disease Risk scale and the Environmental Health Risk scale so that throughout the questionnaire the multi-item Likert scale and subscale response options were presented from highest to lowest. As a result of this change, the Likert response options in the Personal Disease Risk scale and the Environmental Health Risk scale were presented from the highest to the lowest levels of perceived risk: “High Risk”, “Moderate Risk”, “Slight Risk”, and “Almost No Risk”. In addition to formatting changes, alternative wording was substituted for a number of English-language idioms that were identified that could not be translated literally into Spanish.

The version of the translation for presentation to the RPS-DD author was then back-translated from Spanish into English (DE). The last step involved a consultation with the RPS-DD author to check for retention of original intent of each of the items. Presented in the consultation were: the Spanish-language translation, the English-language back-translation, the findings of the focus group, and a summary of the decisions and rationale of the changes made in the translation and harmonization process.

After this process, the version of the translation for field-testing was approved for use in the second phase of the study by the RPS-DD author. Despite the concerns brought forward by the focus group regarding the possible performance of the reversed items in the Personal Control subscale, the reversed items in the Personal Control subscale were retained unchanged at the request of the original RPS-DD author.

### **Field-testing of the New Spanish version of the RPS-DD**

In the second phase of the study, the new Spanish-language translation of the RPS-DD was field-tested in a convenience sample of 146 Spanish-speaking Latino adults who were recruited in August and September 2014 from those attending a food pantry distribution, and at health promotion events and free health clinics in the San Francisco Bay Area, in northern California. Inclusion criteria were: age ≥ 20 years; Latino ethnicity; foreign-born living in the US, and speak predominantly Spanish at home. Exclusion criteria were known medical history of diabetes (other than history of gestational diabetes), and current pregnancy. Spanish-speaking research staff distributed written one-page flyers containing a description of the study in Spanish and English to adults arriving at recruitment sites. Once flyers were distributed, the research staff were present and available to supply further information about the study in Spanish and English to potential participants expressing interest in the study.

The new Spanish-language RPS-DD survey was administered as a paper-based questionnaire, with assistance for comprehension needs available if needed from the research staff. Included in the paper-based survey were additional measures of demographics. Also measured were, height (portable stadiometer) and weight (AND UC-300 Precision Health Scale), with participants wearing light clothing and shoes. Glycosylated hemoglobin (A1c) level was measured with a finger-stick procedure using a CLIA-waived point-of-care A1c testing device (Siemens Vantage DCA Analyzer). The A1c test results, available in 6 minutes, were communicated to participants verbally and in writing, along with their weight, height, a brief written interpretation of the results, and a list of resources for follow-up if needed. Participants also received a 10-dollar gift card for their

time. All participants provided written consent prior to study enrollment. The study was approved by the Institutional Review Board of the University of California, San Francisco.

## Statistical Analysis

Univariate analyses were used to describe sample characteristics including: sociodemographics, medical history, and BMI. To evaluate the internal-consistency reliability, Cronbach's alpha analyses were performed. Exploratory principal components analyses with oblique rotation of the Likert-items of the new Spanish-language RPS-DD were used to determine whether the items contained within each section clustered together into meaningful scales and subscales. All analyses were performed with STATA version 13.

## Results

The characteristics of the sample are shown in Table 1. The mean age of participants was 39.5 (SD 9.9) years old, 74% were women, and 93% were foreign-born from Mexico or Central America. Educational attainment level was less than high school graduate in 61% and annual household income was reported as less than \$20,000 by 80% of the sample and less than \$10,000 by 48%. Family history of diabetes was reported by 35%, history of gestational diabetes by 14%, and history of prediabetes by 11%. The majority (81%) was overweight or obese. A1c was indicative of prediabetes in 12 %, and probable diabetes, in 2% of participants.

Exploratory principal components analyses were performed to determine if the new Spanish-language RPS-DD Likert items measured unidimensional constructs in the target population. When analyzed initially as a group of Likert items as presented in the questionnaire, the items from the Personal Control, Optimistic Bias, and Worry subscales did not cluster together as hypothesized. However, when the two reverse-scored items in the Personal Control subscale were removed, a very clean solution was obtained establishing that the remaining six containing three subscales do measure the three constructs as specified by the author of the original RPS-DD (Table 2). Interestingly, one of the two reversed items removed was the item identified by the focus group as being problematic. In the sample, neither the Personal Disease Risk scale responses nor the Environmental Health Risk scale responses loaded onto a single factor. Following the original scoring guide, available from the website of the RPS-DD author, we calculated scale scores for these two measures by reversing select items then averaging non-missing items for each subscale and scale. Thus, all subscale and scale scores ranged from 1 to 4 with high scores indicating a higher level of the assessed construct. Descriptive statistics and subscale and scale reliabilities are shown in Table 3. Internal consistency reliability ranged from 0.54 to 0.88.

The mean Personal Control subscale score was 3.34 (SD 0.76), indicating a generally high level of perceived influence of personal actions over modifiable diabetes risk. The mean Optimistic Bias subscale score was 2.55 (SD 0.92), indicating a moderate level of confidence compared to peers, that diabetes would not be developed. The mean Worry subscale score was 2.96 (SD 0.80), indicating a moderate degree of concern and anxiety associated with risk perception of developing diabetes. The mean Personal Disease Risk



scale score was 1.73 (SD 0.67), indicating only a slight level of perceived risk to health of global diseases and health conditions. The mean Environmental Health Risk scale score was 1.89 (SD 0.79), indicating that in general, environmental hazards are perceived as posing a low level of risk to health.

In the field-test sample, performance on the test of knowledge of risk factors for developing diabetes varied by the content of the test items. In Table 4, we indicate the correct answer to each item along with the results. The average number of correct items out of 11 was 4.36 (SD 2.18). More than 68% of the participants were able to correctly answer the item that asked if a healthful diet decreases the risk for developing diabetes. In addition, more than 74% were able to correctly answer the items that asked if exercising regularly and controlling weight gain decrease a person's risk for developing diabetes. However, more than 66% answered, "Don't Know", when asked about the effects on risk for developing diabetes of race and ethnicity including: Asian American, American Indian, African American and Caucasian. When asked about the effect on risk for developing diabetes of being Latino, only 40% of participants provided the correct answer, and 40% percent selected "Don't Know".

## Discussion

This study was conducted to create and field-test a new Spanish-language translation of the RPS-DD that measures perceived risk for developing diabetes and modifying factors. The findings contribute to evidence of validation of inferences made using these measures in US adults foreign-born from Mexico and Central America that speak predominately Spanish at home.

The factor analysis findings provided evidence for validation of inferences made from the Personal Control, Optimistic Bias, and Worry subscales of the new Spanish-language RPS-DD in this population. It was confirmed that the Optimistic Bias and Worry subscales were unidimensional when scored according to the published scoring guide for the RPS-DD (Walker, 2009). The Personal Control subscale was also unidimensional when the two items that were reverse-scored were removed. Neither the Personal Disease Risk scale, nor the Environmental Health Risk scale, loaded on a single factor, indicating that in this population the items in these scales measure more than one construct. This finding suggests that in this population using the new Spanish-language RPS-DD, the Personal Disease Risk and the Environmental Health Risk scales should be treated as indexes rather than scales that measure a single underlying constructs.

The range of internal consistency reliabilities of the new Spanish-language RPS-DD multi-item Likert subscales and scales in our study is comparable to published findings from studies using the English-language RPS-DD. Among participants in the Diabetes Prevention Program research trial, the range of reliabilities was 0.68 to 0.85 (Walker, Fisher, Marrero, McNabb, & Diabet Prevent Program Res, 2001). In a sample of practicing physicians, reported reliabilities ranged from 0.64 to 0.83 (Walker et al., 2003). In non-Latino white patients of an academic hospital primary care practice, characterized by high levels of educational attainment, reliabilities ranged from 0.51 to 0.80 (Hivert, Warner, Shrader,

Grant, & Meigs, 2009). The low reliability obtained for the Worry subscale in our study, 0.54, is consistent with the only published reliability obtained for the Worry subscale, 0.51 (Hivert et al., 2009).

The findings of the psychometric measurement properties of the Personal Disease Risk and Environmental Health Risk scales may differ from findings in previous studies in part due to the low educational attainment levels that characterized our sample. The Personal Disease Risk scale encompasses a global range of diseases and health conditions. Also the hazards included in the Environmental Health Risk scale vary greatly in dimensions that may affect perception of risk including: degree of familiarity, degree of dread, and the number of people exposed (World Health Organization, 2002).

Individuals with higher levels of educational attainment may infer that items grouped together on the questionnaire are intended to measure underlying constructs, whereas such insights may not be readily apparent to individuals with lower levels of educational attainment. In addition, it is reasonable to assume that many of the people in the sample may not have previously reflected on the risks the items in the scales were intended to elicit. Therefore, requiring participants to formulate new judgments that may entail complex cognitive operations before selecting response options may be unwise (Krosnick, 1999).

The average number of correct responses on the test of knowledge of risk factors of developing diabetes in this sample, 4.36 of a total of 11 items, was lower than has been found in other samples characterized by higher levels of educational attainment (Hivert et al., 2009; Walker et al., 2003). This difference may be due in part to the inclusion in the test of 5 items that assess knowledge of the effects of belonging to certain racial/ethnic groups on risk for developing diabetes. The fact that “Don't know” was often selected by many participants on the items in the test is consistent with survey research findings in samples characterized by lower levels of educational attainment (Krosnick, 1999).

## Limitations

Caution should be exercised in interpreting the findings of this study due to a number of considerations. Evidence supporting the validation of inferences made with the new Spanish-language RPS-DD may have been stronger if this study's findings had demonstrated evidence of theoretical relationships between the constructs measured by the RPS-DD and related constructs measured by other means. Evidence of validation has been found by Walker et al. (2003) for the published English-language RPS-DD in a sample of practicing physicians by demonstrating anticipated theoretical group relationships between physiological risk for diabetes measured using the ADA Diabetes Risk Test and scores of four of the scales and subscales of the RPS-DD: Personal Disease Risks, Personal Control, Worry, and Optimistic Bias. However, since markedly lower levels of educational attainment and knowledge of diabetes risk factors characterized our sample, the nature and direction of the theoretical relationships between the constructs could not be assumed. Exploratory factor analysis techniques were used in this study despite the limited numbers of items within the identified subscales of the new Spanish-language RPS-DD. Additionally, although internal consistency reliability levels 0.50 to 0.70 are considered acceptable when making group comparisons by some psychometric theorists (Switzer, Wisniewski, Belle, Dew, & Schultz,

1999), it is standard practice to exercise caution in interpreting measurements based on instrument scales with internal consistency reliabilities less 0.70.

## Conclusions

This was the first evaluation of the unidimensionality of the scales and subscales of either the original English-language version of the RPS-DD or a Spanish-language version of RPS-DD. The new Spanish-language translation of the RPS-DD that was created contains subscales that measure three unidimensional constructs: Personal Control, Optimistic Bias, and Worry subscales. Neither the Personal Disease Risk scale, nor the Environmental Health Risk scale, measure unidimensional constructs, rather they provide indices of risk. The sample in this study was characterized as having lower levels of educational attainment and yearly household income. Future studies should include measurement of health literacy. Also, the sample was US adults foreign-born from Mexico and Central America and spoke predominately Spanish. All of these demographic characteristics have been associated with health gaps making this target sample important to study.

The findings of this study may lead to improvements in communication between patients, their nurse clinicians and other healthcare team members. Too often in clinical care, health prevention communication is limited to brief patient education to correct myths and mistaken beliefs about health risks and preventative strategies. Rather, effective health prevention communication and persuasion principally rests on relationships developed over time between patients and their healthcare team, based on genuine caring about concerns, respectfully listening to reasoning, and providing information in a non-judgmental manner. The measures in the new Spanish-language translation of the RPS-DD can be used as tools to enhance this communication by broadening the dialogue between patients, nurses and other members of the healthcare team. The findings of this study may also contribute to nursing and multidisciplinary behavioral research aimed at understanding cultural variation in judgments made by individuals about risk of developing diabetes. Individual perception of diabetes risk may determine engagement in preventive lifestyle modifications. Diabetes prevention effectiveness trials, including a large ongoing trial of a Diabetes Prevention Program modeled intervention offered through a partnership between a health system and the YMCA (Ackermann et al., 2014), are measuring diabetes risk perception with the English-language version of the RPS-DD. Future similar effectiveness trials in Spanish-speaking at-risk populations may benefit from the newly created Spanish-language translation of the RPS-DD and the reliability and validation evidence.

## Acknowledgments

The authors acknowledge the assistance of two experienced translators: Edith Beltran and Deneille Erikson; and Spanish-speaking research staff: Daniela Gramajo and Erica Ochoa. We appreciate the comments of Dr. Elizabeth Walker during the Spanish translation of the RPS-DD. We also would like to thank Dr. Anita Stewart for her contribution to the preparation of this manuscript, and Dr. Steven Paul for his assistance with statistical analysis.

This research was supported in part by research awards from the National Institutes of Health (T32NR007088 and T32DK097718); Sigma Theta Tau International, Alpha Eta Chapter, and the University of California, San Francisco Graduate Division.

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**Table 1**  
**Characteristics of study participants (N=146)**

Characteristic	n (%)
Mean age (years) *	39.5 (SD±9.9)
Sex	
Female	108 (74.0)
Country of origin *	
Mexico	60 (41.1)
Central American country (other than Mexico)	75 (51.4)
Other Latin American country	9 (6.2)
Educational attainment	
Less than 9 <sup>th</sup> grade	68 (46.6)
9 <sup>th</sup> to 11 <sup>th</sup> grade	21 (14.4)
High school graduate	42 (28.8)
Some college, college graduate, or advanced degree	15 (10.3)
Yearly household income *	
Less than \$10,000	70 (48.0)
\$10,000 to \$15,000	25 (17.1)
\$15,000 to \$20,000	21 (14.4)
\$20,000 to \$25,000	12 (8.2)
\$25,000 to \$35,000	14 (9.6)
\$35,000 to \$50,000	3 (2.1)
Medical History	
Family history of diabetes (mother, father, sister or brother)	51 (34.9)
History of gestational diabetes	21 (14.4)
History of prediabetes	16 (11.0)
BMI **	
BMI Normal (18.5 - 24.9 Kg/m <sup>2</sup> )	28 (19.2)
BMI Overweight (25.0 - 29.9 Kg/m <sup>2</sup> )	61 (41.8)
BMI Obese (30.0 - 39.9 Kg/m <sup>2</sup> )	52 (35.6)
BMI Extremely Obese (40.0 Kg/m <sup>2</sup> or greater)	5 (3.4)
A1c	
5.6% or less	126 (86.3)
5.7% - 6.4%	17 (11.6)
6.5% or greater	3 (2.1)

\* Due to missing responses percentages do not add to 100

\*\* To adjust for measurement with shoes and clothes prior to calculation of BMI: 1 cm subtracted from height and 4 lbs subtracted from weight

**Table 2**  
**Factor loadings and unique variances based on a principal components analysis with**  
**oblique rotation for 6 items from the new Spanish-language RPS-DD\* (N=140)\*\***

	Factor 1	Factor 2	Factor 3	Uniqueness
3. I think that my personal efforts will help control my risks of getting diabetes. <i>Creo que las cosas que yo haga me van a ayudar a controlar los riesgos de tener diabetes.</i>	<b>0.9054</b>	0.0384	0.0975	0.2076
4. People who make a good effort to control the risks of getting diabetes are much less likely to get diabetes. <i>Las personas que hacen mucho esfuerzo por controlar los riesgos de tener diabetes tienen bastantes menos probabilidades de tener diabetes.</i>	<b>0.7738</b>	0.0914	-0.0691	0.3234
5. I worry about getting diabetes. <i>Me preocupa que vaya a tener diabetes.</i>	-0.3104	0.1928	<b>0.7520</b>	0.2581
6. Compared to other people of my same age and sex (gender), I am <i>less</i> likely than they are to get diabetes. <i>En comparación con otras mujeres de mi misma edad, es menos probable que yo tenga diabetes.</i>	0.0489	<b>0.8882</b>	0.0502	0.2096
7. Compared to other people of my same age and sex (gender), I am <i>less</i> likely than they are to get a serious disease. <i>En comparación con otras mujeres de mi misma edad, es menos probable que yo tenga una enfermedad grave.</i>	0.0546	<b>0.8225</b>	-0.0990	0.2503
8. Worrying about getting diabetes is very upsetting. <i>El hecho de preocuparme de que yo pueda tener diabetes me estresa mucho.</i>	0.2056	-0.1834	<b>0.8837</b>	0.1900

\* Items 1 and 2 of the new Spanish-language translation of the RRS-DD not included

\*\* 6 observations with missing values excluded

**Table 3**  
**Mean Scores and Reliabilities of Spanish-language RPS-DD scales and subscales (N=146)**

Scale or subscale	No. of items	Mean ( $\pm$ SD)	Cronbach alpha
Personal Control *	2	3.34 ( $\pm$ 0.76)	0.67
Optimistic Bias **	2	2.55 ( $\pm$ 0.92)	0.72
Worry	2	2.96 ( $\pm$ 0.80)	0.54
Personal Disease Risk (global)	15	1.73 ( $\pm$ 0.67)	0.88
Environmental Health Risk ***	9	1.89 ( $\pm$ 0.79)	0.88

NOTE: All scales range from 1 to 4, with high scores indicating a higher level of the construct.

\*

Items 1 and 2 of Personal Control subscale not included

\*\*

2 observations excluded due to missing values

\*\*\*

1 observation excluded due to missing values



**Table 4**  
**Knowledge of risk factors for type 2 diabetes (N=146)**

Item	Correct answer	Responded correctly	Responded incorrectly	Answered "Don't know" "No lo sé" (or response missing)
33. Being Asian American <i>Ser asiático</i>	Increases the risk Aumenta el riesgo	6 (4.1)	39 (26.7)	101 (69.2)
34. Being Caucasian <i>Ser anglosajón</i>	Has NO effect on risk No tiene ningún efecto en el riesgo	19 (13.0)	27 (18.5)	100 (68.5)
35. Eating a healthy diet <i>Comer saludable</i>	Decreases the risk Disminuye el riesgo	100 (68.5)	23 (15.8)	23 (15.8)
36. Being Black or African American <i>Ser afroamericano</i>	Increases the risk Aumenta el riesgo	13 (8.9)	31 (21.2)	102 (69.9)
37. Being Hispanic <i>Ser hispano/latino</i>	Increases the risk Aumenta el riesgo	58 (39.7)	30 (20.5)	58 (39.7)
38. Having had diabetes during pregnancy <i>Haber tenido diabetes durante el embarazo</i>	Increases the risk Aumenta el riesgo	55 (37.7)	27 (18.5)	64 (43.8)
39. Having a blood relative with diabetes <i>Tener un familiar con diabetes</i>	Increases the risk Aumenta el riesgo	90 (61.6)	16 (11.0)	40 (27.4)
40. Being 65 years of age or older <i>Tener 65 o mas años</i>	Increases the risk Aumenta el riesgo	69 (47.3)	31 (21.2)	46 (31.5)
41. Exercising regularly <i>Hacer ejercicio regularmente</i>	Decreases the risk Disminuye el riesgo	111 (76.0)	19 (13.0)	16 (11.0)
42. Being American Indian <i>Ser nativoamericano (indígena americano)</i>	Increases the risk Aumenta el riesgo	7 (4.8)	40 (27.4)	99 (67.8)
43. Controlling weight gain <i>Controlar o disminuir el sobrepeso</i>	Decreases the risk Disminuye el riesgo	109 (74.7)	21 (14.4)	16 (11.0)

Presented as n (%)