

## INDIRECT HEALTH-RELATED SOCIAL CONTROL AND PSYCHOLOGICAL FUNCTIONING IN SINGAPOREANS WITH DIABETES

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We examined indirect health-related social control and the underlying mechanisms of its association with psychological functioning in patients with type 2 diabetes. Singaporean late middle-aged and older adults ( $N = 199$ ) completed questionnaires measuring indirect social control, self-efficacy, internal diabetes locus of control, and psychological functioning. We used a bootstrapping approach and structural equation modeling to analyze the data. Results showed that indirect social control was associated with diabetes-related emotional distress and depressive symptoms via the mediator of internal diabetes locus of control, but self-efficacy did not mediate this relationship. More specifically, indirect social control was positively associated with higher internal diabetes locus of control, which, in turn, had a negative impact on diabetes-related emotional distress and depressive symptoms.

*Keywords:* indirect social control, health-related social control, type 2 diabetes, self-efficacy, locus of control, psychological functioning.

Family plays a significant role in chronic disease management, especially for older adults. For instance, 92.1% of senior citizens in Singapore reported that they turn to their family for support when they are ill, and 91.4% do so when they need to talk to someone (Ministry of Community Development, Youth and

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Sports, 2005). As a major source of help, family can greatly influence patients' disease management and their psychological functioning. Recent researchers have suggested that health-related social control is an important mechanism for how family relationships influence patients' health behaviors and disease management (see, e.g., Khan, Stephens, Franks, Rook, & Salem, 2013; Stephens et al., 2013). Health-related social control operates in two ways, direct and indirect, with the latter having been studied much less.

### **Indirect Health-Related Social Control and Psychological Functioning**

*Direct health-related social control* is defined as social network members' attempts to regulate, influence, or constrain health behaviors, whereas *indirect health-related social control* refers to an internalized sense of responsibility to others to stay healthy (Umberson, 1987). Both direct and indirect social control have often been studied with occupancy in social roles used as a proxy measure. For example, Umberson (1987) found that marital and parental status could deter people from engaging in health-compromising behaviors, such as smoking and drinking. This research approach implies responsibility to others as well as a direct influence or regulation from others, incorporating both direct and indirect social control. More recently, there has been a much larger body of research on direct social control (e.g., Stephens et al., 2013). Thus, we aimed to address the current gap in the literature by providing a better understanding of indirect health-related social control.

Given that indirect health-related social control involves feelings of responsibility to others to engage in healthy behaviors, it has the potential to influence both physical and psychological health (Mirowsky & Ross, 2003). People who experience more indirect social control report more frequent attempts to engage in healthy behaviors and more positive affect (Tucker, 2002). Moreover, individuals' belief that others depend on them is negatively related to engaging in unhealthy behaviors, such as smoking (Rook, Thurans, & Lewis, 1990). Further, Tucker, Elliott, and Klein (2006) found that an internalized sense of obligation to others was positively related to positive affect. Given that late middle-aged and older adults with chronic illness must often cope with psychological distress, we expected that indirect social control would relate to better psychological functioning.

In this study, we focused on the role of indirect social control among Singaporean late middle-aged and older adults with type 2 diabetes. In Singapore, 19.3% of 50–59-year-olds and 29.1% of 60–69-year-olds have diabetes, and among 18–69-year olds the prevalence increased from 8.2% in 2004 to 11.3% in 2010 (Ministry of Health, 2011). The intensive self-care activities and fear of complications mean that patients with diabetes can experience emotional distress or depression. Thus, we examined the associations between indirect social control and psychological functioning in people diagnosed with type 2 diabetes.

### **Mechanisms Underlying Indirect Social Control and Psychological Functioning**

A greater sense of obligation to family members to stay healthy can promote an individual's perceptions that they can control their health outcomes through their own actions (Umberson, Crosnoe, & Reczek, 2010). More specifically, indirect social control can instill in individuals a belief that they are capable of engaging in disease management, and that they can take charge of their own health by adhering to medical regimens or by being positive, thus fulfilling their responsibility to family members. Researchers have also shown that a sense of responsibility to others is positively related to greater confidence in dealing with daily stressors (Gartland, O'Connor, & Lawton, 2012). Given that diabetes management involves lifestyle modifications, which also may be daily stressors, we suspected that indirect social control might promote self-efficacy in behaviors related to managing diabetes.

In addition, *internal health locus of control* refers to the extent to which people believe that internal factors are responsible for their health, and those with a high level of this locus of control tend to take responsibility for their own health and more actively engage in health-enhancing behaviors (Cobb-Clark, Kassenboehmer, & Schurer, 2014). If people with greater indirect social control can maintain their health through their own behaviors, or at least endorse such a belief, this would reinforce internal locus of control.

Self-efficacy and internal health locus of control could also promote psychological health. The belief in one's abilities to engage in behaviors to manage diabetes is termed *diabetes self-efficacy* (Bandura, 1999). Researchers have shown that patients with diabetes who have higher self-efficacy are less likely to report depression, whereas patients with lower self-efficacy are more likely to experience diabetes-related distress (Law, Walsh, Queralt, & Nouwen, 2013). A higher internal health locus of control may be more adaptive for people with diabetes, as diabetes management requires patients' responsibility and effort, and their actions can affect the disease's symptoms and prognosis. Internal health locus of control is positively related to psychological functioning (Ryan & Francis, 2012).

### **The Present Study**

In this study, we examined the association of indirect social control with psychological functioning and the mechanisms underlying this relationship in Singaporean late middle-aged and older adults with type 2 diabetes. Specifically, we formed the following hypotheses:

**Hypothesis 1:** Higher indirect social control will be associated with higher psychological functioning, that is, lower levels of type 2 diabetes-related emotional distress and depressive symptoms.

**Hypothesis 2:** Internal health locus of control and self-efficacy will mediate the relationship between indirect social control and psychological functioning among people diagnosed with type 2 diabetes.

## Method

### Participants and Procedure

We recruited 199 participants through flyers and key community contacts at locations including centers and mobile clinics run by the Diabetic Society of Singapore, and community clubs. Inclusion criteria were as follows: (a) having been diagnosed with type 2 diabetes for 1 year or more, (b) being aged 50 years or older, (c) being Singapore citizens with Chinese ethnicity, and (d) having no major complications or other severe diseases that would interfere with self-care activities. For further details on recruitment, see Yang, Pang, and Cheng (2016). All methods and procedures were approved by the university institutional review board and informed consent was obtained from participants.

Among the participants, the mean age was 63 years ( $SD = 8.46$ ) and 48.2% were male. The majority were married (74.7%; 5.1% divorced/separated; 11.6% widowed; 8.6% single), lived with their spouse and/or children (85.4%; 11.6% lived alone; 3.0% lived with other relatives or nonrelatives), had medical insurance (67.2%), and had completed secondary school as their highest level of education (42.9%; 8.6% no formal education; 22.2% completed primary school; 14.1% junior college/polytechnic; 9.1% bachelor's degree; 3.0% master's degree).

### Measures

**Indirect social control.** Participants reported their experience of indirect social control using an adapted four-item scale (Tucker, 2002). A sample item is "I feel a sense of responsibility to my family to try to stay in good health." Responses are made on a 4-point Likert scale ranging from 1 = *strongly disagree* to 4 = *strongly agree*, with the average of the scores indicating the degree of experience of indirect social control. Cronbach's alpha reliability in this study was .80.

**Diabetes self-efficacy.** We measured diabetes self-efficacy using a seven-item subscale of the Multidimensional Diabetes Questionnaire (Talbot, Nouwen, Gingras, Gosselin, & Audet, 1997), in the context of participants' confidence in their ability to perform diabetes self-care activities (e.g., diet, exercise, medication). A sample item is "How confident are you in your ability to follow your diet?" Responses are made on a scale ranging from 0 = *not at all confident* to 100 = *very confident*. Scores are averaged to indicate individuals' self-efficacy level in relation to diabetes management. Cronbach's alpha reliability in this study was .88.

**Internal diabetes locus of control.** We measured internal health locus of control with Form C of the Multidimensional Health Locus of Control Scale, which is often used among individuals with specific medical conditions (Wallston, Stein, & Smith, 1994). For this study, we replaced the term “condition” with “diabetes” to measure internal diabetes locus of control (IDLC). A sample item is “If my diabetes worsens, it is my own behavior that determines how soon I will feel better again.” Responses are made on a 6-point Likert scale ranging from 1 = *strongly disagree* to 6 = *strongly agree*, and scores are summed to determine the level of IDLC. Cronbach’s alpha reliability in this study was .79.

**Diabetes-related emotional distress.** We used the Problem Areas in Diabetes Scale-1 (Polonsky et al., 1995) to measure participants’ diabetes-related emotional distress. Sample items include “Feeling overwhelmed by your diabetes” and “Worrying about the future and the possibility of serious complications.” Responses are made on a 5-point scale ranging from 0 = *not a problem* to 4 = *serious problem*, then the sum of the 20 items is multiplied by 1.25 to yield a final score between 0 and 100. Cronbach’s alpha reliability in this study was .96.

**Depressive symptoms.** To measure depressive symptoms, we used the Patient Health Questionnaire–9 (Spitzer, Kroenke, & Williams, 1999), which consists of nine items based on the nine diagnostic criteria for major depression disorder in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994). A sample is “Over the last 2 weeks, how often have you been bothered by little interest or pleasure in doing things?” Responses are made on a 4-point Likert scale ranging from 0 = *not at all* to 3 = *nearly every day*. The sum of the items ranges from 0 to 27 and indicates the severity of depressive symptoms. Cronbach’s alpha reliability in this study was .85.

**Covariates.** Covariates included age, gender, marital status, length of time since diagnosis with diabetes, treatment modality, comorbidity, and relationship satisfaction with family members. To control for the latter, patients responded to the question “How satisfied do you feel about your relationship with your family?” (Tucker, 2002), using a scale ranging from 1 = *extremely dissatisfied* to 7 = *extremely satisfied*.

### Data Analysis

The mediation model was first tested for diabetes-related emotional distress and depressive symptoms, controlling for the abovementioned covariates. We then tested the models using the bootstrapping approach with Hayes’ (2013) SPSS PROCESS macro. The bootstrapping confidence interval for the indirect effect is a bias-corrected estimate based on 10,000 bootstrap samples. We then used structural equation modeling (SEM) to test the whole model, incorporating indirect social control, self-efficacy, IDLC, diabetes-related emotional distress, and depressive symptoms.

## Results

### Preliminary Results

With respect to participants' clinical features, their mean time since diagnosis of diabetes was 11.98 years ( $SD = 9.25$ ), 7.7% had adopted lifestyle modifications following diagnosis, 7.7% used insulin, 73.5% took oral hypoglycemic drugs, and 11.2% were on both insulin and oral hypoglycemic drugs. Among the participants, 71.4% had comorbid medical conditions. Of these, 81.0% had hypertension, 45.1% had hyperlipidemia, 9.2% had heart disease, 3.5% had cancer, and 2.8% had other conditions that were not specified.

Bivariate correlations among the variables showed that indirect health-related social control was positively related to IDLC and negatively related to depressive symptoms. Further, self-efficacy was negatively related to diabetes-related emotional distress and depressive symptoms. Finally, IDLC was negatively related to diabetes-related emotional distress and depressive symptoms.

### Mediation Analysis Using Bootstrapping Approach

In the case of diabetes-related emotional distress, there was a significant negative relationship between indirect social control and diabetes-related emotional distress via the mediator of IDLC,  $B = -1.69$ , 95% confidence interval (CI)  $[-4.15, -0.24]$  excluding zero, whereas the relationship between indirect social control and diabetes-related emotional distress via the mediator of self-efficacy was not significant,  $B = -0.53$ , 95% CI  $[-2.17, 0.19]$  including zero. More specifically, indirect social control was positively and significantly related to IDLC,  $B = 2.23$ ,  $p < .001$ , and IDLC, in turn, was negatively and significantly related to diabetes-related emotional distress,  $B = -0.76$ ,  $p = .034$ .

In the case of depressive symptoms, the relationship between indirect social control and depressive symptoms via the mediator of IDLC was significant,  $B = -0.33$ , 95% CI  $[-0.86, -0.01]$  excluding zero, whereas the relationship between indirect social control and depressive symptoms via the mediator of self-efficacy was not significant,  $B = -0.08$ , 95% CI  $[-0.41, 0.03]$  including zero. More specifically, indirect social control was positively and significantly related to IDLC,  $B = 2.23$ ,  $p < .001$ , and IDLC, in turn, was negatively and significantly related to depressive symptoms,  $B = -0.15$ ,  $p = .039$ .

These results suggest that IDLC, but not self-efficacy, mediated the relationship between indirect health-related social control and diabetes-related emotional distress and depressive symptoms.

### Structural Equation Modeling Results

We also tested the whole mediation model using SEM and controlling for covariates. As Figure 1 shows, indirect social control was positively related

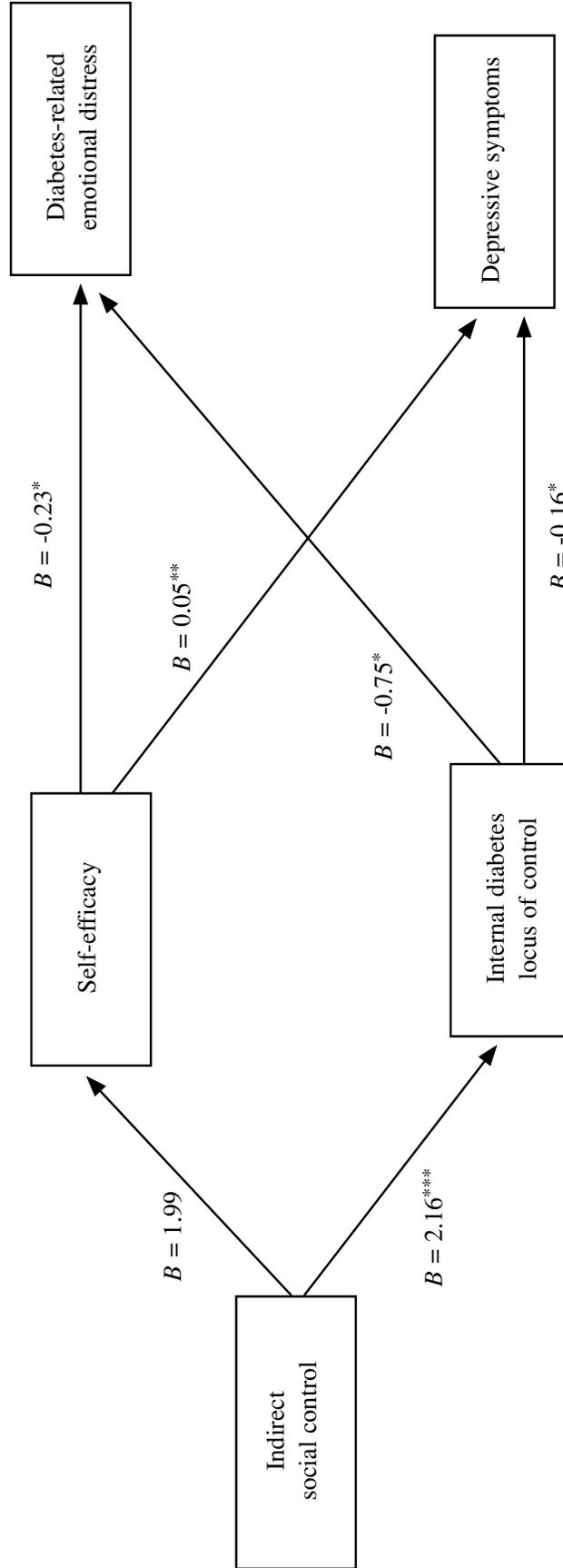


Figure 1. Structural equation modeling results for the whole model. Note. The model includes the covariates of age, gender, marital status, and relationship satisfaction with family members. \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

to IDLC, which, in turn, was negatively related to diabetes-related emotional distress and depressive symptoms. However, the mediating role of self-efficacy was not significant. The whole model had good level of fit: chi square = 3.118, degrees of freedom = 2,  $p = .210$ , comparative fit index = .99, root mean square error of approximation = .05. These results support those we obtained from the bootstrapping approach.

## Discussion

We examined the role of indirect health-related social control, that is, a sense of responsibility to family members to stay healthy, in the psychological functioning of people diagnosed with diabetes. Indirect social control was associated with psychological functioning via IDLC, but not via self-efficacy. Further, indirect social control was positively related to IDLC, which, in turn, was negatively related to diabetes-related emotional distress and depressive symptoms.

Indirect social control works through a sense of responsibility to family members; thus, it is consistent with Asian cultural values relating to family interdependence. In this context, the self is often defined in terms of relationships with family and the obligation to maintain harmonious familial relationships, which involves norms of mutual understanding and relatedness (Tseng & Hsu, 1991). Under such a cultural influence, indirect social control could be a factor in encouraging patients to take better care of themselves. If people do not take good care of themselves and stay healthy, they may bring a burden to their family members' normal life and work, or even to the family's financial status, which violates their sense of responsibility to family members. Simply put, indirect social control is a strong motivator for patients to achieve better psychological health.

Our results show that IDLC, but not self-efficacy, mediated the relationship between indirect social control and psychological functioning. Responsibility to family members to stay healthy is an important resource for IDLC, and can be translated into a belief that an individual's health is determined by their own behaviors (AbuSabha & Achterberg, 1997). However, we found that self-efficacy was not a significant mediator in this relationship. According to Bandura (1999), four major sources contribute to the development of self-efficacy: mastery experience, vicarious experience, social persuasion, and physiological and emotional state. The sense of responsibility to family members to stay healthy seems relevant to none of these four sources, and would not improve self-efficacy. In addition to experiencing daily stressors related to diabetes, managing this disease might be complex and challenging, suggesting that indirect social control may not necessarily translate into self-efficacy.

Several limitations to this study should be noted. First, it is possible that only those who are active in their type 2 diabetes self-care activities self-selected to participate in this study. Moreover, we focused on late middle-aged and older Chinese Singaporeans. These factors may limit the generalizability of the results. Second, we used a cross-sectional survey design; thus, we cannot demonstrate the causality among the variables. Given the other possible explanations for our results, we examined alternative models to exclude such possibilities and found that the reverse mediation model of the relationship between indirect social control and psychological functioning via the mediator of IDLC was significant with a much smaller, negligible effect. The use of alternative models may partially remedy the limitations of a cross-sectional study design, but longitudinal studies are needed to substantiate the causal relationships between the variables we used.

To the best of our knowledge, this study represents the first attempt to elucidate the underlying mechanisms of indirect social control and psychological functioning in late middle-aged and older adults with type 2 diabetes. Our findings highlight the importance of fostering patients' sense of responsibility to their family members to stay healthy and their individual obligation to manage diabetes. Living in a supportive family environment may help patients develop a belief that they need to take good care of themselves in order not to disappoint their supportive family. Future intervention programs should be developed that are focused on cultivating a supportive family atmosphere and fostering patients' responsibility to family members to maintain healthy behaviors, or targeting patients' IDLC.

## References

- AbuSabha, R., & Achterberg, C. (1997). Review of self-efficacy and locus of control for nutrition- and health-related behavior. *Journal of the American Dietetic Association, 97*, 1122–1132. <https://doi.org/cw6xqk>
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Bandura, A. (1999). Social cognitive theory of personality. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 154–196). New York, NY: Guilford Press.
- Cobb-Clark, D. A., Kassenboehmer, S. C., & Schurer, S. (2014). Healthy habits: The connection between diet, exercise, and locus of control. *Journal of Economic Behavior & Organization, 98*, 1–28. <https://doi.org/b8ps>
- Gartland, N., O'Connor, D. B., & Lawton, R. (2012). The effects of conscientiousness on the appraisals of daily stressors. *Stress and Health, 28*, 80–86. <https://doi.org/brq6c7>
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford Press.
- Khan, C. M., Stephens, M. A. P., Franks, M. M., Rook, K. S., & Salem, J. K. (2013). Influences of spousal support and control on diabetes management through physical activity. *Health Psychology, 32*, 739–747. <https://doi.org/f42z42>

- Law, G. U., Walsh, J., Queralt, V., & Nouwen, A. (2013). Adolescent and parent diabetes distress in type 1 diabetes: The role of self-efficacy, perceived consequences, family responsibility and adolescent-parent discrepancies. *Journal of Psychosomatic Research, 74*, 334–339. <https://doi.org/f2g52d>
- Ministry of Community Development, Youth and Sports. (2005). *The National Survey of Senior Citizens in Singapore 2005*. Retrieved from <https://bit.ly/2tiqaED>
- Ministry of Health. (2011). *National Health Survey 2010 Singapore*. Retrieved from <https://bit.ly/2seNDHw>
- Mirowsky, J., & Ross, C. E. (2003). *Social causes of psychological distress* (2nd ed.). New York, NY: de Gruyter.
- Polonsky, W. H., Anderson, B. J., Lohrer, P. A., Welch, G., Jacobson, A. M., Aponte, J. E., & Schwartz, C. (1995). Assessment of diabetes-related distress. *Diabetes Care, 18*, 754–760. <https://doi.org/drfhzb>
- Rook, K. S., Thuras, P. D., & Lewis, M. A. (1990). Social control, health risk taking, and psychological distress among the elderly. *Psychology and Aging, 5*, 327–334. <https://doi.org/bzjmf3>
- Ryan, M. E., & Francis, A. J. P. (2012). Locus of control beliefs mediate the relationship between religious functioning and psychological health. *Journal of Religion and Health, 51*, 774–785. <https://doi.org/dfx5vg>
- Spitzer, R. L., Kroenke, K., & Williams, J. B. W. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *Journal of American Medical Association, 282*, 1737–1744. <https://doi.org/b9xrff>
- Stephens, M. A. P., Franks, M. M., Rook, K. S., Lida, M., Hemphill, R. C., & Salem, J. K. (2013). Spouses' attempts to regulate day-to-day dietary adherence among patients with type 2 diabetes. *Health Psychology, 32*, 1029–1037. <https://doi.org/f5c5zf>
- Talbot, F., Nouwen, A., Gingras, J., Gosselin, M., & Audet, J. (1997). The assessment of diabetes-related cognitive and social factors: The Multidimensional Diabetes Questionnaire. *Journal of Behavioral Medicine, 20*, 291–312. <https://doi.org/c8w2xw>
- Tseng, W.-S., & Hsu, J. (1991). *Culture and family: Problems and therapy*. New York, NY: Haworth Press.
- Tucker, J. S. (2002). Health-related social control within older adults' relationships. *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences, 57*, 387–395. <https://doi.org/cqphg2>
- Tucker, J. S., Elliott, M. N., & Klein, D. J. (2006). Social control of health behavior: Associations with conscientiousness and neuroticism. *Personality and Social Psychological Bulletin, 32*, 1143–1152.
- Umberson, D. (1987). Family status and health behaviors: Social control as a dimension of social integration. *Journal of Health and Social Behavior, 28*, 306–319.
- Umberson, D., Crosnoe, R., & Reczek, C. (2010). Social relationships and health behaviors across the life course. *Annual Review of Sociology, 36*, 139–157. <https://doi.org/bqwxpw>
- Wallston, K. A., Stein, M. J., & Smith, C. A. (1994). Form C of the MHLC Scales: A condition-specific measure of locus of control. *Journal of Personality Assessment, 63*, 534–553. <https://doi.org/c57wm3>
- Yang, F., Pang, J. S., & Cheng, W. J. Y. (2016). Self-care adherence and psychological functioning of older patients with type 2 diabetes: Effects of persuasion, social pressure, and self-efficacy. *Journal of Clinical Psychology in Medical Settings, 23*, 389–401. <https://doi.org/f9gctz>