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Does self-efficacy mediate the cross-sectional relationship between perceived quality of health care and self-management of diabetes? Results from Diabetes MILES - Australia

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Keywords: Australia; diabetes; population; quality of care; self-efficacy; self-management
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Abstract

Objective: Quality of health care (QoC) and self-efficacy may affect self-management of diabetes, but such effects are not well understood. We examined the indirect role of diabetes-specific self-efficacy (DSE) and generalised self-efficacy (GSE) in mediating the cross-sectional relationship between self-reported QoC and diabetes self-management.

Design: Diabetes MILES–Australia was a national survey of 3,338 adults with diabetes. We analysed data from 1,624 respondents (Age: M=52.1, SD=13.9) with type 1 (T1D; n=680) or type 2 diabetes (T2D; n=944), who responded to a version of the survey containing key measures.

Main Outcome Measures: Self-reported healthy eating, physical activity, self-monitoring of blood glucose frequency, HbA1c, medication/insulin adherence.

Results: We used Preacher and Hayes’ bootstrapping method, controlling for age, gender and diabetes duration, to test mediation of DSE and GSE on the relationship of QoC with each self-management variable. We found statistically significant but trivial mediation effects of DSE and GSE on most, but not all, variables (all effect sizes <0.06).

Conclusion: Support for mediation was weak, suggesting that relationships amongst these variables are small and that future research might explore other aspects of self-management in diabetes.

Keywords: Australia; diabetes; population; quality of care; self-efficacy; self-management
Does self-efficacy mediate the cross-sectional relationship between perceived quality of health care and self-management of diabetes? Results from Diabetes MILES - Australia

Diabetes mellitus, including type 1 (T1D) and type 2 diabetes (T2D), is a chronic condition that places significant demands on individuals, healthcare professionals, and healthcare systems (Narayan et al., 2000). Diabetes prevalence, particularly T2D, has more than doubled in Australia since 1989, attributed to increasing obesity and physical inactivity, and an ageing population (Australian Institute of Health & Welfare [AIHW], 2009): approximately 1.7 million Australians are estimated to have diabetes, but only half of those with T2D have been diagnosed (Barr et al., 2006).

Self-management is essential, with 98% of everyday decisions about medication, lifestyle and self-monitoring of blood glucose (SMBG) made by people with diabetes themselves (Parchman, Arambula-Solomon, Noel, Larme, & Pugh, 2003). Self-management can be complex, requiring extensive knowledge and skills (Funnell & Anderson, 2004). Suboptimal self-management can lead to serious complications, impair quality of life, and reduce life expectancy (AIHW, 2010; Golin, DiMatteo, Leake, Duan, & Gelberg, 2001).

T1D is an autoimmune disorder, and treatment involves multiple daily insulin injections or continuous subcutaneous infusion via an insulin pump for survival (Rodgers, 2009; Stene, Harjutsalo, Moltchanova, & Tuomilehto, 2010). T2D, in contrast, is often considered a ‘lifestyle disease’, though its causes are complex. Some people with T2D can manage their condition with diet, weight management and physical activity (Hall & Davies, 2008). Typically, oral hypoglycaemic medication is needed to optimise blood glucose levels, and progression to insulin therapy (with or without oral medication) is increasingly recommended (Hall & Davies, 2008). Regular SMBG via a finger-prick blood test is also recommended for many people with diabetes to guide self-management (Phillips, 2012).
People with diabetes require regular consultations with health professionals, including general practitioner, diabetes educator, dietitian, podiatrist, ophthalmologist, and endocrinologist (Kermani, 2008). Australian guidelines recommend measurement of glycated haemoglobin (HbA1c) twice a year: this reflects average blood glucose levels over eight to twelve weeks; it is regarded as the gold standard for assessing glycaemic control (Colagiuri, Dickinson, Girgis, & Colagiuri, 2009; Phillips, 2012) and a reliable indicator of risk of complications such as blindness, kidney damage, stroke, or heart disease.

Despite convincing evidence for its value, only 20-35% of people with diabetes maintain all aspects of treatment (Golin, et al., 2001; Heisler, Bouknight, Hayward, Smith, & Kerr, 2002). In Australia, approximately 50% of people with T2D have HbA1c levels above the target maximum of 7% (Wan, et al., 2006). Interpersonal processes between people with diabetes and health professionals are recognised as crucial (O'Brien, et al., 1992; WHO, 2003), but research identifies a significant gap between actual and optimal quality of care for diabetes in Australia (Taggart, Wan, Harris, & Powell Davies, 2008; Wan, et al., 2006), with practice emphasising physiological tests, rather than self-management and person-centred communication. Satisfaction with care and perceived quality of care are closely related, and patient satisfaction is widely used as an indicator of quality of care (Davies & Ware, 1988). Large-scale studies (e.g., Rubin, Peyrot, & Siminerio, 2006) have demonstrated that quality of care is positively related to self-reported wellbeing, self-management, and glycaemic control. However, the mechanisms by which quality of care affects self-management are not well understood (Heisler, et al., 2002).

Self-efficacy has received considerable attention as an individual factor potentially affecting diabetes self-management (Griva, Myers, & Newman, 2000; WHO, 2003; van der Ven, et al., 2003). Social cognitive theory (e.g., Luszczynska & Schwarzer, 2005) is built on Bandura’s concept of self-efficacy, defined as an individual’s confidence in his or her ability to perform specific tasks required to reach a desired goal (Bandura, 1997). It hypothesises that
self-efficacy is the proximal determinant of behaviour; in particular, it identifies self-efficacy as determining whether a person faced with a challenging situation will act positively to manage it, or not. Self-efficacy itself is affected by direct experience, interactions and observations of others, and formal instruction, but is hypothesised to be the common pathway by which these experiences change behaviour (Bandura, 1997). Diabetes-specific self-efficacy is thus defined as confidence in one’s ability to attain the behavioural goals of diabetes treatment regimens (Sharoni & Wu, 2012; van der Ven, et al., 2003). However, researchers have also described a trait-like ‘generalised self-efficacy’ which reflects a global sense of coping ability across a wide range of challenging circumstances (Jerusalem & Schwarzer, 1992). Whilst this is theoretically distinct from Bandura’s conception of self-efficacy, it is hypothesised to be another pathway by which life experiences may affect behaviour, and thus may also be relevant to diabetes self-management.

Longitudinal research shows moderate positive relationships between self-efficacy (both specific and generalised) and disease management (e.g., Clark & Dodge, 1999), including diabetes self-management behaviours such as medication-taking, dietary modifications, physical activity, and SMBG (Krichbaum, Aarestad, & Buethe, 2003). Diabetes-specific self-efficacy (DSE) has been shown to have stronger associations with self-management behaviours than other variables, including previous medication-taking (Kavanagh, et al., 1993), psychosocial factors (Zulman, Rosland, Choi, Langa, & Heisler, 2012) and relevant beliefs (Griva et al., 2000). It has also been shown to be associated with lower HbA1c (Griva et al., 2000; Kavanagh et al., 1993).

Regimen-specific measures of self-efficacy are more strongly related to self-care behaviours than are more general measures, as predicted by social cognitive theory (Glasgow, Hampson, Strycker, & Ruggiero, 1997). Nevertheless, generalised self-efficacy (GSE) also predicts self-management behaviours (e.g., Clark & Dodge, 1999). Only one study has assessed both DSE and GSE in diabetes management. This found the two to be moderately correlated,
and both significantly associated with self-reported adherence, although the diabetes-specific measure had a slightly stronger relationship (Griva, et al., 2000).

High-quality, person-centred care is assumed to work, in part, by enhancing self-efficacy (Heisler, et al., 2002; Michie, Miles, & Weinman, 2003). There has been little direct research to test this hypothesis, but it is consistent with social cognitive theory (Luszczynska & Schwarzer, 2005). High-quality diabetes care involves the person with diabetes in direct experience, positive interaction, information-sharing, observation, and formal instruction (for example in monitoring and interpreting blood glucose levels), activities that are hypothesised to raise self-efficacy.

Thus, the aim of this paper is to assess the potential mediating role of self-efficacy, assessed by both a diabetes-specific and a generalised self-efficacy measure, in the cross-sectional relationship between perceived quality of care and self-reported diabetes self-management. Of course, a cross-sectional study cannot provide evidence of causal relationships: finding such a mediational path says nothing about the possible direction of influence (for example, successful adherence might raise self-efficacy, which then makes the individual feel more positive about healthcare), but it can indicate whether data are consistent with such a hypothesis. We used data from the Diabetes MILES (Management and Impact for Long-term Empowerment and Success) – Australia 2011 survey (Speight, Browne, Holmes-Truscott, Hendrieckx, & Pouwer, 2012). Diabetes MILES was a national cross-sectional survey examining psychosocial and behavioural variables amongst adults with T1D or T2D. In this paper, we assess the extent to which diabetes-specific self-efficacy (DSE) and generalised self-efficacy (GSE) mediate the relationship between perceived quality of care and self-reported self-management of diabetes.

We hypothesised, firstly, that there would be positive associations between perceived quality of care and self-reported aspects of self-management: healthy eating, physical activity, SMBG frequency, HbA1c, and medication/insulin adherence. Secondly, we hypothesised that
diabetes-specific and generalised self-efficacy would mediate these relationships, with the diabetes-specific measure having a stronger mediation effect.

Method

Data Source

The Diabetes MILES-Australia 2011 survey involved six separate versions, tailored for three groups (T1D, T2D insulin-treated, and T2D non-insulin-treated), with an A and B version of each. These contained the same core measures but different secondary measures, to reduce respondent burden. The complete participant profile and procedure for the Diabetes MILES survey is described elsewhere (Speight, et al., 2012) and is outlined briefly here.

Participants

In 2011, a random sample of 15,000 registrants of the Australian National Diabetes Services Scheme (NDSS) were mailed the survey. An online version was also advertised nationally. The NDSS sample was stratified to ensure representation of T1D and T2D and the main treatment regimens. In total 3,338 adults completed the survey: 41% with T1D and 58% T2D, proportional to the ratio of surveys distributed (40:60). We used data from 1,624 respondents (54% women, age range 18-70) who responded to Version B, containing the psychosocial variables used in this analysis.

Measures

Quality of care (QoC). This measure was derived from the 49-item Group Health Association of America Consumer Satisfaction Survey (Davies & Ware, 1991). We used 6 items, based on the version used in the Australian Longitudinal Study on Women’s Health (Lee et al., 2005). Participants rated ‘the health professional you rely upon the most’ on time spent in consultation; explanation of problems and treatment; interest in their opinions; opportunity to ask questions; technical skills; and personal manner. Items were rated on a 5-point scale from 1 (poor) to 5 (excellent). Cronbach’s alpha in this sample was α=0.96.
Diabetes-specific self-efficacy (DSE). The Diabetes Empowerment Scale-Short Form (DES-SF; Anderson, Fitzgerald, Gruppen, Funnell, & Oh, 2003) is an eight-item measure of self-efficacy related to diabetes. A stem statement, ‘In general, I believe that I can…’ was followed by questions covering: recognising need for change; developing a plan; overcoming barriers; asking for support; supporting oneself; coping with emotions; motivating oneself; and making appropriate diabetes care choices. Items were rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). Cronbach’s alpha in this sample was α=0.90.

Generalised self-efficacy (GSE). The generalised self-efficacy scale (Schwarzer & Jerusalem, 1995) assesses self-beliefs to cope with life demands. The scale includes ten items, rated from 1 (not at all true) to 4 (exactly true). For example, ‘I can always manage to solve difficult problems if I try hard enough’. Reliability and validity have been demonstrated across settings and cultures (see Luszczynska, Gutierrez-Dona, & Schwarzer, 2005; Scholz, Dona, Sud, & Schwarzer, 2002). Cronbach’s alpha in this sample was α=0.93.

Healthy eating and physical activity. Single items from the Diabetes Self-Care Inventory - Revised (van der Ven et al., 2005) were used as indicators of healthy eating and physical activity. The items were: ‘how often do you follow a healthy diet (including: eating sufficient vegetables/fruits, monitoring the amount of fat you consume, not overeating, spreading meals and snacks evenly throughout the day)?’ and ‘how often do you meet the norm for healthy exercise (at least 5 days per week, at least half an hour of moderately intensive physical activity, for example walking or cycling)?’. Items were rated on a 5-point scale from 1 (never) to 5 (almost always). Higher scores indicate more optimal self-management.

SMBG frequency. Participants were asked ‘on average, how many blood glucose checks have you done each day?’ for the past 2 weeks, with possible responses ranging from ‘0’ to ‘7 or more’. This has been shown to correlate with clinical outcomes such as HbA1c (Griva, et al., 2000).
Participants answered a single open-ended item, ‘What was your HbA1c last time it was checked?’, with a ‘don’t know’ option. With some variability across individuals, an HbA1c ≤7% is regarded as indicating optimal diabetes management.

Medication/insulin adherence. The Medication Adherence Rating Scales (MARS; Horne & Weinman, 1999) measured adherence to insulin (MARS-Ins) and to oral medications (MARS-Medi). Diabetes-specific items were added to the original four-item scales, and the MARS-Ins (seven items) and the MARS-Medi (six items) were both rated on a 5-point scale from 1 (always) to 5 (never). Cronbach’s alpha in this sample was α=0.72 (MARS-Ins) and α=0.77 (MARS-Medi). Lower scores indicate better adherence.

Demographic and control variables. Participants recorded demographic information, type of diabetes, treatment, and time since diagnosis.

Statistical Analyses

Preliminary analyses. There was little missing data (under 2%), but 17.4% of participants with T1D and 43.9% with T2D reported not knowing their HbA1c level. Missing data were excluded on an analysis-wise basis, meaning that sample sizes vary across analyses.

We used Hayes’ (2009) regression-based bootstrapping method, to examine direct and mediated relationships between QoC and each of the dependent variables: healthy eating, physical activity, SMBG frequency, HbA1c level, and medication and insulin adherence. Each analysis was adjusted for age, gender and diabetes duration, and tested mediation of both DSE and GSE simultaneously. Separate tests were conducted for people with T1D and with T2D for each dependent variable, except for medication and insulin adherence, where the T2D group was further broken down into those using oral medication only and those using both medication and insulin. Each test was conducted with 5,000 iterations, to generate effect size estimates and 95% confidence intervals.

Results
Participant characteristics

Demographic, clinical and psychosocial characteristics are shown in Table 1. As expected, people with T1D were generally younger, but had been diagnosed with diabetes for a longer time, than those with T2D. The T1D group had a greater proportion of women, and were more likely to have completed high school or have further qualifications, and to be in paid employment (these two variables were strongly correlated with age).

The groups did not differ on perceived quality of care, diabetes-specific self-efficacy, or general self-efficacy. Of the dependent variables, they did not differ on self-reported healthy eating or physical activity. People with T1D reported greater SMBG frequency, better insulin adherence, but higher HbA1c, than people with T2D. Those with T1D were also more likely to know their HbA1c level than those with T2D.

Table 1 about here

Age and diabetes duration were significantly correlated with several dependent variables, and there were several gender differences. Therefore, we adjusted for age, gender and diabetes duration in all analyses. Most variables showed considerable skew, but we followed Cohen (1983) and MacCallum, Zhang, Preacher, & Rucker (2002) in analyzing them as continuous, untransformed variables. The zero-order paths from independent to mediator variables were small, only one meeting Cohen’s (1988) definition of a ‘small’ effect in regression-based designs ($r^2=0.1$), but all were significant at $p<.01$. For the T1D group (N=670), values were QoC-GSE $r^2=0.048$; QoC-DSE $r^2=0.095$. For the T2D group (N=907), values were QoC-GSE $r^2=0.036$; QoC-DSE $r^2=0.169$. The relationships between GSE and DSE were small but significant (T1D $r^2=0.222$; T2D $r^2=0.168$).

Main Analyses
Table 2 summarises the mediation analyses. All effects significant at p<.05 are shown in bold, but none of these effects meets Cohen’s (1988) definition of a ‘small’ effect. Thus, we describe patterns of statistical significance but note that in every case the effect size is trivial.

Table 2 about here

The direct relationships between QoC and the dependent variables are significant for self-reported healthy eating, physical activity, HbA1c, and insulin adherence among the T1D group, for self-reported healthy eating and physical activity among the T2D group, and for medical adherence amongst the T2D group using oral medication only. These effects range in magnitude from .028 to .091, suggesting that the relationships, while statistically significant, are very small. However, mediation is explored for all variables, even if the direct effect is not significant, in line with the contemporary understanding that a non-significant effect may still be mediated (e.g., Rucker, Preacher, Tormala, & Petty, 2011).

The relationships between QoC and self-reported healthy eating and physical activity are significantly mediated by both DSE and GSE, for both T1D and T2D groups, as indicated by the significant indirect effects. However, these indirect effects are all very small and the lower bounds of the 95% CIs close to zero. For both groups, the direct relationship between QoC and SMBG is non-significant; the indirect relationship via DSE, but not via GSE, reaches statistical significance but is trivial in magnitude (.011 and .008 for T1D and T2D respectively).

Findings for the other dependent variables differ according to group. For the T1D group, both DSE and GSE mediate the relationship between QoC and HbA1c (significant effects for both indirect paths). Insulin adherence, as for healthy eating and physical activity, shows mediation by DSE, but not by GSE. For the T2D group, DSE mediates the relationship between QoC and HbA1c but GSE does not. For those with T2D who use oral medication only, neither DSE nor GSE mediates the relationship between QoC and oral medication adherence. For those with T2D who use both oral medication and insulin, DSE mediates the relationship between
QoC and oral medication adherence, but there are no significant effects for insulin adherence. Again, however, all these effects are extremely small.

**Discussion**

We investigated cross-sectional relationships between perceived quality of health care and diabetes self-management behaviours, and also examined both diabetes-specific and generalised self-efficacy as potential mediators, across aspects of diabetes self-management and outcomes: healthy eating, physical activity, self-monitoring of blood glucose, HbA1c, and medication/insulin adherence.

All direct and indirect relationships were extremely small; none reached the minimum suggested by Cohen (1988) to be considered a ‘small’ effect. Whilst, overall, diabetes-specific efficacy consistently produced significant indirect effects, again these were extremely small. General self-efficacy was less likely to produce significant indirect effects.

The overall pattern of results shows that the hypothesised relationships between quality of care and self-management behaviours, and the indirect effects of diabetes-specific and general self-efficacy, were weak and inconsistent. These findings resonate with the view that specific self-management behaviours vary in their antecedents and thus may respond to highly behaviour-specific change strategies (Toobert, Hampson, & Glasgow, 2000).

The large scale of this study, its use of standardised measures where possible, and its interdisciplinary focus on a range of variables across medical, social and psychological domains, all support the robustness of these findings. Of course, secondary analysis is always limited by available data: for example, the use of single items to measure diet and physical activity is less than ideal, but this decision was affected by the need to cover a large number of variables in an omnibus survey, without exceeding participant capacity. The use of self-report for HbA1c is also less than ideal, particularly considering the concerningly large number of participants who did not know their HbA1c level. This is a general issue with community-based
surveys, which must trade off representativeness and sample size against direct measurement of some variables. However, a further major weakness is the cross-sectional nature of the design, which means that causal relationships cannot be established.

The weak findings, even with a cross-sectional design that may overestimate such relationships, suggest that that neither perceived quality of care nor specific or general self-efficacy is meaningfully related to diabetes self-management behaviours amongst people with T1D or T2D. Recent years have seen criticism of influential theories of health behaviour (e.g., Ogden, 2003; Sniehotta, Presseau & Araújo-Soares, 2014). Social cognition and health belief models have been criticised for their assumption that people make rational decisions based on logical analysis of factual information (see Corrigan, Rüsch, Ben-Zeev, & Sher, 2014), and because they often focus on the individual in isolation, rather than in social context. There is considerable interest in couple- and family-focused interventions for chronic disease management, particularly diabetes (e.g., Fisher, 2006), on the assumption that family interactions have the potential to support or to undermine behaviour change, although the empirical evidence for this is quite limited (e.g., Trief, Ploutz-Snyder, Britton, & Weinstock, 2004).

However, the central findings of this study are, firstly, that our measure of quality of care was not reliably associated with self-reported self-management or with HbA1c, and, secondly, that self-efficacy did not meaningfully mediate those relationships. Even where effects were significant, they were extremely small. Such findings suggest that future research on diabetes self-management needs to move beyond the traditional cognitive-behavioural theories of health behaviour.

At a theoretical level, our focus on perceived quality of care provided by the health professional may not adequately address the transactional and interpersonal aspects of active engagement with the diabetes regimen by the individual. Consistent with a contemporary emphasis on person-centred care (e.g., Bauman, Fardy, & Harris, 2003; Inzucchi et al., 2011),
other models foreground the person living with the chronic condition, not the health professional, and in particular the individual’s understandings of the causes and consequences of his or her illness (e.g., the Common Sense Model of Illness: Hagger & Orbell, 2003), or readiness to make major lifestyle changes (e.g., the Transtheoretical Model of Behaviour Change: Jones et al., 2003). Given the weak evidence found in this study for relationships amongst perceived quality of care, self-efficacy, and diabetes self-management, we argue that integration of these perspectives into models of change, together with the use of new technology to provide information and support in home and community settings, might provide stronger predictions of optimal self-management as well as potential strategies to improve outcomes.
References


living with type 1 or type 2 diabetes in Australian adults. *BMC Public Health, 12*, 120-144. doi: 10.1186/1471-2458-12-120


Table 1. Participant Demographic, Clinical, Psychological and Self-Management Characteristics by Diabetes Type

<table>
<thead>
<tr>
<th>Variables</th>
<th>Type 1 diabetes (N=680)</th>
<th>Type 2 diabetes (N=944)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean (SD)</td>
<td>Mean (SD)</td>
</tr>
<tr>
<td><strong>Demographic and Control Variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>42.6 (14.28)</td>
<td>58.9 (8.65)</td>
</tr>
<tr>
<td>Diabetes duration (years)</td>
<td>15.3 (12.72)</td>
<td>9.2 (7.20)</td>
</tr>
<tr>
<td>Sex (% female)</td>
<td>60.1%</td>
<td>50.3%</td>
</tr>
<tr>
<td>Relationship status (% partnered)</td>
<td>73.6%</td>
<td>73.0%</td>
</tr>
<tr>
<td>Education (% with 12 years or more)</td>
<td>91.5%</td>
<td>74.2%</td>
</tr>
<tr>
<td>In paid work (%)</td>
<td>68.9%</td>
<td>41.9%</td>
</tr>
<tr>
<td><strong>Independent variable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality of Care</td>
<td>22.22 (5.87)</td>
<td>22.50 (5.70)</td>
</tr>
<tr>
<td><strong>Mediators</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes self-efficacy</td>
<td>3.75 (0.78)</td>
<td>3.76 (0.74)</td>
</tr>
<tr>
<td>Generalised self-efficacy</td>
<td>30.68 (4.78)</td>
<td>30.26 (5.05)</td>
</tr>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy eating</td>
<td>3.60 (1.15)</td>
<td>3.54 (1.14)</td>
</tr>
<tr>
<td>Physical activity</td>
<td>2.93 (1.34)</td>
<td>2.82 (1.30)</td>
</tr>
<tr>
<td>SMBG frequency</td>
<td>4.08 (1.93)</td>
<td>2.07 (1.50)</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>7.72 (1.64)</td>
<td>7.30 (1.80)</td>
</tr>
<tr>
<td>Medication Adherence:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insulin</td>
<td>27.88</td>
<td>30.74</td>
</tr>
</tbody>
</table>
Oral medication    7-35    -    28.17    -

(3.91)   (3.76)

**p<.001

*a17.4% with T1D and 43.9% with T2D responded ‘do not know’ (χ² = 95.4, p<.001).

SD: standard deviation; SMBG: self-monitoring of blood glucose
Table 2. Mediation analyses: Relationships of Quality of Care with Healthy Eating, Physical Activity, Diet, Physical Activity, Self-Monitoring of Blood Glucose (SMBG), HbA1c, and Medication/Insulin Adherence, directly and mediated by Diabetes-Specific Self Efficacy and by General Self-Efficacy, conducted separately for Type 1 and Type 2 Diabetes groups.

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>N</th>
<th>Direct effect of Quality of Care</th>
<th>Residual effect of Quality of Care</th>
<th>Indirect via Diabetes-Specific Self Efficacy</th>
<th>Indirect via General Self-Efficacy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy Eating</td>
<td>559</td>
<td>0.028 (.012, .044)</td>
<td>0.010 (-.006, .026)</td>
<td>0.011 (.005, .019)</td>
<td>0.007 (.003, .013)</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>644</td>
<td>0.034 (.017, .052)</td>
<td>0.016 (-.001, .034)</td>
<td>0.007 (.001, .015)</td>
<td>0.011 (.006, .018)</td>
</tr>
<tr>
<td>SMBG</td>
<td>646</td>
<td>0.005 (-.015, 0.38)</td>
<td>0.012 (-.015, .038)</td>
<td>0.011 (.001, .023)</td>
<td>0.008 (-.018, .001)</td>
</tr>
<tr>
<td>HbA1c</td>
<td>526</td>
<td>-0.048 (-.071, -.024)</td>
<td>-0.025 (-.049, -.001)</td>
<td>-0.016 (-.029, -.006)</td>
<td>-0.007 (-.015, -.002)</td>
</tr>
<tr>
<td>Insulin adherence</td>
<td>622</td>
<td>-0.091 (-.139, -.042)</td>
<td>-0.033 (-.082, .016)</td>
<td>-0.056 (-.085, -.035)</td>
<td>-0.002 (-.015, .010)</td>
</tr>
<tr>
<td>Healthy Eating</td>
<td>832</td>
<td>0.047 (.034, .060)</td>
<td>0.021 (.007, .034)</td>
<td>0.022 (.016, .030)</td>
<td>0.004 (.001, .007)</td>
</tr>
<tr>
<td>Physical Activity</td>
<td>861</td>
<td>0.039 (.024, .054)</td>
<td>0.015 (-.001, .031)</td>
<td>0.020 (.013, .028)</td>
<td>0.004 (.001, .008)</td>
</tr>
<tr>
<td>SMBG</td>
<td>862</td>
<td>0.006 (-.012, .024)</td>
<td>-0.002 (-.021, .017)</td>
<td>0.008 (.001, .017)</td>
<td>0.000 (-.004, .004)</td>
</tr>
<tr>
<td>HbA1c</td>
<td>453</td>
<td>0.022 (-.051, .007)</td>
<td>0.001 (-.031, .033)</td>
<td>-0.022 (-.040, -.010)</td>
<td>-0.001 (-.012, .006)</td>
</tr>
<tr>
<td>Medication adherence</td>
<td>452</td>
<td>-0.051 (-.088, -.014)</td>
<td>-0.027 (-.068, .014)</td>
<td>-0.017 (-.070, .001)</td>
<td>-0.009 (-.019, .002)</td>
</tr>
<tr>
<td>Type 2 Diabetes (oral medication and insulin)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication adherence</td>
<td>253</td>
<td>-0.008 (-.063, .050)</td>
<td>0.015 (-.044, .073)</td>
<td>-0.020 (-.038, -.007)</td>
<td>-0.002 (-.015, .002)</td>
</tr>
<tr>
<td>Insulin adherence</td>
<td>295</td>
<td>-0.074 (-.153, .004)</td>
<td>-0.061 (-.143, .022)</td>
<td>-0.014 (-.009, .007)</td>
<td>0.000 (-.009, .012)</td>
</tr>
</tbody>
</table>

Note: Figures are effect sizes (95% CI). Effect sizes in bold are significant at p<.05. All analyses adjusted for gender, age and diabetes duration. Bootstraps = 5,000. Sample sizes differ as a result of missing data on outcome variables.