

## Table S2. Notes to Table 2

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<sup>1</sup> The reported findings in (A) (the second through fourth columns) are from MIMIC model specifications in which the non-traditional *ordinal* items of Depression (Lonely, People Unfriendly, People Disliked Me, and Fearful), which serve as reflective indicators, are also specified as *continuous* variables that predict Depression (i.e. as formative indicators). This allows estimates of bi-directional relationships between each non-traditional item and Depression. Findings in (B) (columns five through seven) are from MIMIC model specifications in which all twenty CES-D items are specified as both formative and reflective indicators.

<sup>2</sup> The measurement loading ( $\lambda$ ) of the CES-D item Depressed was fixed at 1 to set the metric of the measurement model. Estimated measurement loadings for the remaining CES-D items in (A) ranged from: 0.318 (Hopeful) to 0.888 (Sad); and in (B) ranged from: 0.254 (Unfriendly) to 0.802 (Sad). In the (A) models, 13 to 16 of the 20 measurement loadings were 0.450 or greater, and in the (B) models, 9 to 11 of the 20 measurement loadings were 0.450 or greater.

<sup>3</sup> Each of the MIMIC models fit the data adequately in (A):  $R^2$ : 0.444 to 0.990; and in (B):  $R^2 = 1.000$ . The  $R^2$  fit index is available for MIMIC models with ordinal measurement items, such as the four-category CES-D items in the current study. In (A), the MIMIC models still retain the four non-traditional CES-D items as individual items that serve as reflective (effect) indicators for estimating the pathway of the bi-directional relationship that manifests as a result of Depression. In (B), all CES-D items serve both as formative (causal) and reflective (effect) indicators. Note that models with High BP or Silent CVD (Silent Cerebrovascular Disease) as interaction components were run in subsamples that excluded more progressed cerebrovascular disease (stroke, post-stroke cognitive impairment, vascular cognitive impairment) that may distort findings; comparisons are made only to those with similar levels of atherosclerosis or no vascular disease.

<sup>4</sup> Two-tailed test significance is as follows: 1)  $z = 1.960$  ( $p = .05$ ); 2)  $z = 2.326$  ( $p = .025$ ); 3)  $z = 2.576$  ( $p = .01$ ); 4)  $z = 3.291$  ( $p = .005$ ).

<sup>5</sup> In (A), none of the 17 reflective indicators across the 4 non-traditional CES-D items that are statistically significant remain so in the non-mediated model (i.e., when the formative indicator of each of the four non-traditional items is not also regressed on Diabetes). These 17 reflective indicators are suppressor effects because they become statistically significant only in the mediated model (i.e. they were "suppressed" in the non-mediated model). The importance of the four mediated pathways suggests there may be synergistic effects from unspecified co-occurring illness conditions.

<sup>6</sup> In (A), only 5 of the 15 reflective indicators across the 4 non-traditional CES-D items remain statistically significant in the non-mediated model (i.e., when the formative indicator of each of the four non-traditional items is not also regressed on Heart Failure). These 5 reflective indicators are Bothered by Things, Everything an Effort, Poor Appetite, Restless Sleep, and Not Get Going. The 10 reflective indicators that become statistically significant only in the mediated model are suppressor effects (i.e. they were "suppressed" in the non-mediated model). The importance of the four mediated pathways suggests there may be synergistic effects from unspecified co-occurring illness conditions.

<sup>7</sup> Approaches statistical significance at  $p = 0.060$ .

<sup>8</sup> The mediated model in (A) also reveals statistically significant effects for the lower-order, one-way terms that also contribute to the interaction effect (Diabetes:  $b = 9.560$ ,  $s.e. = 0.332$ ,  $z = 28.804$ ; Heart Failure:  $b = 14.892$ ,  $s.e. = 0.289$ ,  $z = 51.501$ ). This reveals that diabetes and heart failure each predict the total level of depression even when they do not co-occur, and interact synergistically, within the same individual. The non-mediated model (i.e. when the formative indicator of each of the four non-traditional CES-D items is not also regressed on Diabetes x Heart Failure and its lower-order component terms) does not converge to a unique solution. When the regression pathway to predict the latent trait (Depression) is dropped in this non-mediated model, Diabetes x Heart Failure is only statistically significant in predicting the reflective indicator for Happy ( $b = 1.006$ ,  $s.e. = 0.435$ ,  $z = 2.315$ ). The fact that Diabetes, Heart Failure, and Diabetes x Heart Failure only become statistically significant as predictors of the latent trait (Depression) in the mediated model means that they are suppressor effects (i.e. they were "suppressed" in the non-mediated model). Once again, the importance of the four mediated pathways suggests there may be additional synergistic effects from unspecified co-occurring illness conditions.

In (B), the mediated model results in an exhaustively specified MIMIC model, and as expected, it does not converge to a unique solution when specifying all twenty CES-D items also as formative indicators. In the unmediated, full model when all CES-D items are also specified as formative indicators (the reflective indicator for Fearful is dropped), no CES-D item, nor the latent trait (Depression), is statistically significant. In the sequential MIMIC model, when the regression pathway to predict the latent trait (Depression) is dropped, and the reflective indicator for Fearful is retained, Diabetes x Heart failure approaches statistical significance in predicting the reflective indicators for Sad ( $b = 0.921$ ,  $s.e. = 0.499$ ,  $z = 0.065$ ,  $p = 0.065$ ) and Happy ( $b = 0.687$ ,  $s.e. = 0.397$ ,  $z = 1.729$ ,  $p = 0.084$ ). These somewhat inconsistent findings from the unmediated full and sequential MIMIC models with all CES-D items also specified as formative indicators serve as a clue of additional synergistic effects from unspecified co-occurring illness conditions. Subsequent MIMIC models incorporating co-

occurring illness conditions (e.g., hypertension, silent cerebrovascular disease, heart attack, excess weight) reveal additional synergistic effects.

<sup>9</sup> Approaches statistical significance at  $p = 0.054$ .

<sup>10</sup> Neither the latent trait (Depression) nor any of the reflective indicators are statistically significant in the full MIMIC model with all 20 CES-D items also specified as formative indicators. Talked Less than Others became statistically significant in the sequential MIMIC model that controlled for all 20 CES-D reflective indicators (but not also the latent trait, Depression), within the targeted subgroup (Diabetes x High BP x Heart Attack x Heart Failure).

<sup>11</sup> Approaches statistical significance at  $p = 0.053$ .

<sup>12</sup> Approaches statistical significance at  $p = 0.056$  and at  $p = 0.057$ , respectively.

<sup>13</sup> Neither the latent trait (Depression) nor any of the reflective indicators are statistically significant in the full MIMIC model with all 20 CES-D items also specified as formative indicators. Enjoyed Life became statistically significant in the sequential MIMIC model that controlled for all 20 CES-D reflective indicators (but not also the latent trait, Depression) within the targeted subgroup (Diabetes x High BP x Heart Attack x Heart Failure x Excess Weight).

<sup>14</sup> Neither the latent trait (Depression) nor any of the reflective indicators are statistically significant in the full MIMIC model with 4 non-traditional items specified as formative indicators. People Unfriendly became statistically significant in the sequential MIMIC model that controlled for all 20 CES-D reflective indicators (but not also the latent trait, Depression) within the targeted subgroup (Diabetes x High BP x Heart Attack x Heart Failure x Excess Weight).

Similarly, neither the latent trait (Depression) nor any of the reflective indicators are statistically significant in the full MIMIC model with all 20 CES-D items also specified as formative indicators. People Unfriendly again became statistically significant in the sequential MIMIC model that controlled for all 20 CES-D reflective indicators (but not also the latent trait, Depression) within the targeted subgroup (Diabetes x High BP x Heart Attack x Heart Failure x Excess Weight).

<sup>15</sup> In (A), the full MIMIC model does not converge to a unique solution, and the sequential MIMIC does not yield statistically significant estimates for any of the CES-D items or for the latent trait (Depression). In (B), the full MIMIC model yields inflated standard errors for the slopes of several CES-D items, and the sequential MIMIC model does not yield statistically significant estimates for any of the CES-D items or for the latent trait (Depression). These modeling issues may stem from there being only seven (unweighted) observations within this subgroup (Diabetes x Silent CVD x Heart Attack x Heart Failure x Excess

Weight), which is the smallest of all the subgroups.