Moderation analysis

The moderation model considered OHS (DMT) as *independent variable* and OHIP as *dependent variable*, with HUDBI as the *moderator*.

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Model = 1
    Y = ZOHIP
    X = ZDMT
    M = zD_x_zHU

Sample size
        191

**************************************************************************
Outcome: ZOHIP

Model Summary
          R       R-sq        MSE          F        df1        df2          p
      .3330      .1109      .9034     5.9307     3.0000   187.0000      .0007

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.0130      .0714     -.1816      .8561     -.1539      .1279
zD_x_zHU      .2758      .1072     2.5714      .0109      .0642      .4873
ZDMT          .2905      .0986     2.9459      .0036      .0959      .4850
int_1        -.0989      .0816    -1.2123      .2269     -.2598      .0620

Product terms key:

 int_1    ZDMT        X     zD_x_zHU

R-square increase due to interaction(s):
         R2-chng          F        df1        df2          p
int_1      .0212     1.4698     1.0000   187.0000      .2269

**************************************************************************

Conditional effect of X on Y at values of the moderator(s):
   zD_x_zHU     Effect         se          t          p       LLCI       ULCI
    -1.0889      .3981      .1038     3.8371      .0002      .1934      .6028
      .0000      .2905      .0986     2.9459      .0036      .0959      .4850
     1.0889      .1828      .1564     1.1689      .2439     -.1257      .4913

Values for quantitative moderators are the mean and plus/minus one SD from
mean.
Values for dichotomous moderators are the two values of the moderator.
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According to the results from PROCESS, the overall moderation model had significant effects F (3, 187) = 5.93, $p < .001$. However, the overall interaction effect was not significant: *C.I.* = -.26÷.06. We further used the Johnson-Neyman [1] technique to probe for interaction and to identify ranges of values of the moderator for which the interaction effect is significant. Hayes' PROCESS macro for SPSS [2] incorporates the Johnson-Neyman technique [3].

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********************* JOHNSON-NEYMAN TECHNIQUE *************************

Moderator value(s) defining Johnson-Neyman significance region(s)
      Value    % below    % above
      .5158    75.3927    24.6073

Conditional effect of X on Y at values of the moderator (M)
   zD_x_zHU     Effect         se          t          p       LLCI       ULCI
    -4.4882      .7342      .3399     2.1604     .0320      .0638     1.4047
    -3.9709      .6831      .2994     2.2814     .0237      .0924     1.2737
    -3.4536      .6319      .2595     2.4349     .0158      .1199     1.1439
    -2.9364      .5808      .2205     2.6339     .0091      .1458     1.0158
    -2.4191      .5296      .1829     2.8961     .0042      .1689      .8904
    -1.9019      .4785      .1477     3.2387     .0014      .1870      .7700
    -1.3846      .4274      .1174     3.6416     .0004      .1958      .6589
     -.8674      .3762      .0963     3.9065     .0001      .1862      .5662
     -.3501      .3251      .0913     3.5603     .0005      .1450      .5052
      .1672      .2739      .1047     2.6168     .0096      .0674      .4804
      .5158      .2394      .1214     1.9727     .0500      .0000      .4789
      .6844      .2228      .1309     1.7017     .0905     -.0355      .4810
     1.2017      .1716      .1639     1.0469     .2965     -.1518      .4951
     1.7189      .1205      .2004      .6011     .5485     -.2749      .5159
     2.2362      .0693      .2388      .2904     .7719     -.4018      .5405
     2.7535      .0182      .2783      .0654     .9479     -.5308      .5672
     3.2707     -.0329      .3185     -.1034     .9177     -.6612      .5953
     3.7880     -.0841      .3591     -.2341     .8151     -.7925      .6244
     4.3052     -.1352      .4001     -.3380     .7357     -.9245      .6540
     4.8225     -.1864      .4413     -.4224     .6732    -1.0569      .6841
     5.3398     -.2375      .4826     -.4921     .6232    -1.1896      .7146
     5.8570     -.2887      .5241     -.5508     .5825    -1.3226      .7453

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* the values corresponding to the identified regions of significance are show above, in blue.

One such region of significant moderation, from -4.49 to .52 values of HUDI (in z-scores) was identified. The moderation effect was graphically depicted in Figures 4 and 5, in the main text, and showed that the moderator HUDBI strengthened the positive relation between DMT and OHIP, for the regions of significance indicated by the Johnson-Neyman technique.

1. Johnson PO, Neyman J. Tests of certain linear hypotheses and their application to some educational problems. *Statistical research memoirs.* 1936;1:57-93.
2. Hayes AF. PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling. 2012. http://www.afhayes.com/public/process2012.pdf.
3. Hayes AF, Matthes J. Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behavior research methods.* 2009;41(3):924-936.