

## Supplement

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## Exploratory analysis

- Use of the like-button

**Analysis with all five measured emotions**

Table 1: Correlations of emotions and motivation

	1	2	3	4	5
1. happiness					
2. pride	.62***				
3. depression	-.71***	-.56***			
4. anger	-.43***	-.35***	.46***		
5. envy	-.53***	-.42***	.59***	.64***	
6. motivation	.42***	.44**	-.41***	-.21***	-.28***

Note: \*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

**MANOVA with emotions as dependent variable**

A MANOVA with achievement group (none, personal, other's) and time of data collection (before vs. after the introduction of the like button) as the independent variables and the five emotions as dependent variables revealed only a significant multivariate effect of achievement group, Pillai's trace = .10,  $F(10,890) = 4.78$ ,  $p < .001$ ,  $\eta_p^2 = .05$ . The effect of time of data collection, Pillai's trace = .003,

$F(5,444) = 0.26$ ,  $p = .935$ ,  $\eta_p^2 = .003$  and the interaction effect, Pillai's trace = .014,  $F(10,896) = 0.643$ ,  $p = .777$ ,  $\eta_p^2 = .007$ , were not significant. As can be seen in Table 2, univariate tests showed significant effects for four of the five emotions.

Table 2: Means (and standard deviations) of emotions depending as a function of achievement group

	None	Other	Personal	F	p	$\eta_{part}^2$
happiness	4.45 <sub>a</sub> (1.19)	4.60 <sub>a</sub> (1.19)	4.98 <sub>b</sub> (1.10)	5.74	.003	.025
pride	4.17 <sub>a</sub> (.88)	4.33 <sub>a</sub> (.93)	4.86 <sub>b</sub> (1.04)	16.24	<.001	.068
depression	3.53 <sub>a</sub> (1.14)	3.49 <sub>a</sub> (1.07)	3.19 <sub>a</sub> (1.19)	3.04	.049	.013
anger	2.69 <sub>a</sub> (1.34)	2.79 <sub>a</sub> (1.24)	2.66 <sub>a</sub> (1.25)	0.48	.621	.002
envy	2.96 <sub>ab</sub> (1.20)	3.34 <sub>a</sub> (1.34)	2.93 <sub>b</sub> (1.13)	5.04	.007	.022

Note: Means within a row not sharing the same subscript are significantly different at  $p < .05$  (Bonferroni-corrected comparisons)

With regard to H1, we found that respondents experienced more envy when someone else had reached an achievement than when they themselves reached an achievement; here, the control group fell non-significantly between the other two groups. However, a planned comparison with a Welsh's t-test (controlling for unequal cell sizes and inhomogeneous variances) revealed that envy was higher in the others' achievement group than in the two other groups, *Welshs*  $F(1, 449.01) = 11.08$ ,  $p < .001$ . In line with H2, people who were exposed to a personal achievement felt more proud (and also happier) than people who saw no achievement or the achievement of another person. No significant effects were found for anger. Although the main effect on depression was significant, the pairwise comparison between personal and other's achievement reached only marginal significance.

## Process model

To test whether the emotions mediate the effects of source of achievement on motivation we used Process by Hayes (2013). We used *model 4*, a model with several parallel mediators. Testing the role of all five discrete motivations simultaneously is a stronger test of the proposed underlying processes, especially since the emotions are correlated with each other (see Table 1). Source of comparison was used as the independent variable, motivation as the dependent variable. The five emotions were entered as mediators. Benign and malicious envy were entered as covariates. We opted for 10.000 bootstrapping samples.

PROCESS OUTPUT (variables have been renamed)

Run MATRIX procedure:

\*\*\*\*\* PROCESS Procedure for SPSS Release 2.16.3 \*\*\*\*\*

Written by Andrew F. Hayes, Ph.D. [www.afhayes.com](http://www.afhayes.com)

Documentation available in Hayes (2013). [www.guilford.com/p/hayes3](http://www.guilford.com/p/hayes3)

\*\*\*\*\*

Model = 4

Y = motivati

X = who

M1 = pride

M2 = envy

70 M3 = happiness

71 M4 = depression

72 M5 = anger

73

74 Statistical Controls:

75 CONTROL= benign malicious (process only takes 8 letters: stands for trait benign envy and trait malicious  
76 envy)

77

78 Sample size

79 342

80

81 \*\*\*\*\*

82 Outcome: pride

83

84 Model Summary

85	R	R-sq	MSE	F	df1	df2	p
86	.3106	.0965	.9235	12.0327	3.0000	338.0000	.0000

87

88 Model

89		coeff	se	t	p	LLCI	ULCI
90	constant	5.1762	.2685	19.2760	.0000	4.6480	5.7044
91	source	-.5368	.1125	-4.7735	.0000	-.7580	-.3156
92	benign	.1562	.0497	3.1416	.0018	.0584	.2540
93	maliciou	-.1443	.0520	-2.7768	.0058	-.2465	-.0421

94

95 \*\*\*\*\*

96 Outcome: envy

97

98 Model Summary

99	R	R-sq	MSE	F	df1	df2	p
100	.3425	.1173	1.5040	14.9691	3.0000	338.0000	.0000

101

102 Model

103		coeff	se	t	p	LLCI	ULCI
104	constant	1.5961	.3427	4.6578	.0000	.9221	2.2701

105	source	.3894	.1435	2.7132	.0070	.1071	.6716
106	benign	.0117	.0634	.1841	.8541	-.1131	.1365
107	maliciou	.3848	.0663	5.8028	.0000	.2544	.5153

108

109 \*\*\*\*\*

110 Outcome: happiness

111

112 Model Summary

113	R	R-sq	MSE	F	df1	df2	p
114	.2697	.0727	1.2890	8.8356	3.0000	338.0000	.0000

115

116 Model

117	coeff	se	t	p	LLCI	ULCI	
118	constant	5.4920	.3172	17.3120	.0000	4.8680	6.1160
119	source	-.3496	.1329	-2.6318	.0089	-.6110	-.0883
120	benign	.1247	.0587	2.1232	.0345	.0092	.2402
121	maliciou	-.2642	.0614	-4.3038	.0000	-.3850	-.1435

122

123 \*\*\*\*\*

124 Outcome: depression

125

126 Model Summary

127	R	R-sq	MSE	F	df1	df2	p
128	.2910	.0847	1.1612	10.4269	3.0000	338.0000	.0000

129

130 Model

131	coeff	se	t	p	LLCI	ULCI	
132	constant	2.7762	.3011	9.2200	.0000	2.1839	3.3685
133	source	.2827	.1261	2.2416	.0256	.0346	.5307
134	benign	-.1483	.0557	-2.6597	.0082	-.2579	-.0386
135	maliciou	.2873	.0583	4.9305	.0000	.1727	.4020

136

137 \*\*\*\*\*

138 Outcome: anger

139

## 140 Model Summary

141	R	R-sq	MSE	F	df1	df2	p
142	.2243	.0503	1.4702	5.9688	3.0000	338.0000	.0006

143

## 144 Model

145		coeff	se	t	p	LLCI	ULCI
146	constant	1.9835	.3388	5.8545	.0000	1.3171	2.6500
147	source	.1344	.1419	.9473	.3442	-.1447	.4135
148	benign	-.0276	.0627	-.4408	.6597	-.1510	.0957
149	maliciou	.2660	.0656	4.0563	.0001	.1370	.3950

150

151 \*\*\*\*\*

## 152 Outcome: motivation

153

## 154 Model Summary

155	R	R-sq	MSE	F	df1	df2	p
156	.5546	.3076	1.0659	18.4934	8.0000	333.0000	.0000

157

## 158 Model

159		coeff	se	t	p	LLCI	ULCI
160	constant	1.4004	.7139	1.9617	.0506	-.0039	2.8048
161	pride	.2834	.0754	3.7601	.0002	.1352	.4317
162	envy	-.0095	.0658	-.1438	.8858	-.1388	.1199
163	happiness	.2320	.0726	3.1964	.0015	.0892	.3747
164	depression	-.0710	.0797	-.8908	.3737	-.2279	.0858
165	anger	.0416	.0601	.6921	.4893	-.0767	.1599
166	source	-.1304	.1254	-1.0399	.2991	-.3770	.1163
167	benign	.2846	.0547	5.1990	.0000	.1769	.3923
168	maliciou	-.1287	.0589	-2.1848	.0296	-.2447	-.0128

169

170 \*\*\*\*\* DIRECT AND INDIRECT EFFECTS \*\*\*\*\*

171

## 172 Direct effect of X on Y

173	Effect	SE	t	p	LLCI	ULCI
174	-.1304	.1254	-1.0399	.2991	-.3770	.1163

175

176 Indirect effect of X on Y

177 Effect Boot SE BootLLCI BootULCI

178 TOTAL -.2514 .0764 -.4189 -.1156

179 pride -.1521 .0543 -.2820 -.0657

180 envy -.0037 .0294 -.0654 .0539

181 happiness -.0811 .0383 -.1807 -.0233

182 depression -.0201 .0279 -.1022 .0149

183 anger .0056 .0157 -.0106 .0642

184

185 \*\*\*\*\* ANALYSIS NOTES AND WARNINGS \*\*\*\*\*

186

187 Number of bootstrap samples for bias corrected bootstrap confidence intervals:

188 10000

189

190 Level of confidence for all confidence intervals in output:

191 95.00

192

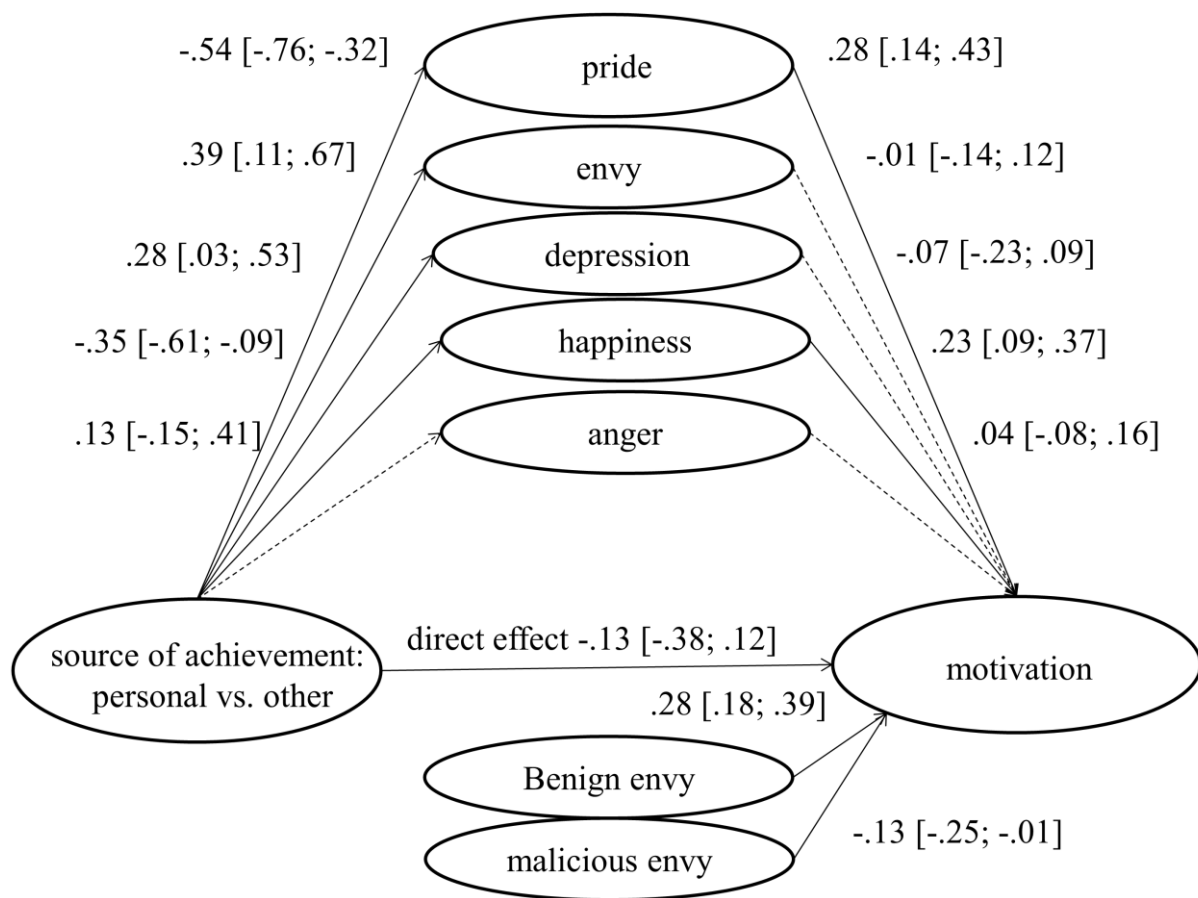
193 NOTE: Some cases were deleted due to missing data. The number of such cases was:

194 140

195

196

197 The effects of achievement source on the five emotions, the effects of the emotions on moving-up motivation,  
 198 the effects of trait benign and malicious envy on moving-up motivation and the direct effect of achievement  
 199 source on moving-up motivation are also displayed in the Figure (coefficient and 95% CI):



200

201

202 Indirect effect via pride:  $-.15 [-.28, -.07]$ 203 Indirect effect via happiness:  $-.08 [-.18, -.02]$ 

204 Additionally, trait benign envy also was related to higher levels of pride and happiness and lower levels of  
 205 depression (see Process output for coefficients). Malicious envy was correlated to all five emotions. The higher  
 206 trait malicious envy, the more envy, depression and anger and the less pride and happiness were reported.

## Data collected before the introduction of the like button

**Effect on emotions.** A MANOVA with achievement group (none, personal, other's) as the independent variable and pride and envy as dependent variables revealed a significant multivariate effect of achievement group, Pillai's trace = .11,  $F(4,460) = 6.73$ ,  $p < .001$ ,  $\eta_p^2 = .09$ . Respondents in the personal achievement group reported higher levels of pride ( $M = 4.88$ ) than people in the other's achievement group ( $M = 4.31$ ) or the control group ( $M = 4.06$ ). The latter two groups did not significantly differ from each other (Bonferroni-protected comparisons). The univariate effect for pride was significant,  $F(2,230) = 11.97$ ,  $p < .001$ ,  $\eta_p^2 = .03$ . The univariate effect for envy was also significant,  $F(2,230) = 3.47$ ,  $p = .033$ ,  $\eta_p^2 = .03$ . Respondents in the other's achievement group reported higher levels of envy ( $M = 3.31$ ) than people in the personal achievement group ( $M = 2.82$ ). The no achievement group did not significantly differ ( $M = 3.06$ ), but a Welch test revealed that envy was higher in the other's achievement group than in the other two conditions,  $F(1,217.42) = 6.39$ ,  $p < .05$ .

**Effect on motivation.** A univariate analysis of variance with source of achievement as independent variable revealed a significant effect of source,  $F(1, 196) = 5.15$ ,  $p = .024$ ,  $\eta_p^2 = .026$ . Participants were more motivated when they were exposed to their personal achievement ( $M = 4.38$ ,  $SD = 1.37$ ) than when they were exposed to someone else's achievement ( $M = 3.95$ ,  $SD = 1.14$ ).

## Mediation model.

We run model 4 from PROCESS (Hayes, 2013) with achievement source (personal vs. other) as independent variable, moving-up motivation as dependent variable, pride and envy as potential mediators and trait benign and malicious envy as covariates. We used 10000 bootstrapping samples.

The direct effect of achievement source (personal vs. other) on motivation was not significant,  $-.04$ ,  $SE = .17$ , 95% CI  $[-.38; .29]$ . There was a significant indirect effect via pride,  $-.27$ ,  $SE = .10$ , 95% CI  $[-.50; -.12]$ . The indirect effect via envy was not significant,  $-.05$ ,  $SE = .04$ , 95% CI  $[-.17; .01]$ . Benign envy was positively related to motivation,  $.34$ ,  $SE = .07$ , 95% CI  $[.19; .48]$ . Malicious envy in contrast was negatively related to motivation,  $-.20$ ,  $SE = .07$ , 95% CI  $[-.35; -.06]$ . Trait malicious envy was negatively related to state envy,  $.26$ ,  $SE = .09$ , 95% CI  $[.09; .43]$ . No other correlations with trait benign or malicious envy were significant.



**237 Data collected after the introduction of the like button**

238 A univariate analysis of variance with achievement group (none, personal, other's) as independent  
239 variable and moving-up motivation as dependent variable revealed a significant effect of source,  $F(1,$   
240  $218) = 1.78, p = .172, \eta_p^2 = .016$ . Descriptively, participants were less motivated when they were  
241 exposed to someone else's achievement ( $M = 4.07, SD = 1.21$ ) than when they were exposed to their  
242 personal achievement ( $M = 4.41, SD = 1.16$ ) or no achievement ( $M = 4.33, SD = 1.19$ ).

**243 Exploratory analyses.**

244 **Effect of the like button.** Although time of data collection had no significant effect in the analyses of  
245 variance, we nevertheless examined the use of the like button and its relationships with our variables.  
246 The like button was not used frequently; 70.6% of the respondents who saw the achievement of  
247 another person indicated that they have not liked this achievement, and 87.2% who saw their personal  
248 achievement indicated to have not received a like. Whether people have given or received a like was  
249 uncorrelated to emotions or motivation, all  $r_s < .17, ns$ .

250

251