

Supplemental Information

SUPPLEMENTAL TABLE 3 Items From the GAIN-SS Scale Used to Assess Internalizing and Externalizing Problems and Subscale Internal Consistency

GAIN-SS Subscale	Items	Internal Consistency, α
Internalizing problems ^a	Feeling very trapped, lonely, sad, blue, depressed, or hopeless about the future?	.81
	Sleep trouble, such as bad dreams, sleeping restlessly, or falling asleep during the day?	
	Feeling very anxious, nervous, tense, scared, panicked, or like something bad was going to happen?	
	Becoming very distressed and upset when something reminded you of the past?	
Externalizing problems ^b	Lied or conned to get things you wanted or to avoid having to do something?	.87
	Had a hard time paying attention at school, work, or home?	
	Had a hard time listening to instructions at school, work, or home?	
	Were a bully or threatened other people?	
	Started physical fights with other people?	
	Felt restless or the need to run around or climb on things?	
Gave answers before the other person finished asking the question?		

^a The prompt for the internalizing problems subscale was as follows: "When was the last time that you had significant problems with..."

^b The prompt for externalizing problems subscale was as follows: "When was the last time that you did the following things two or more times..."

SUPPLEMENTAL TABLE 4 Characteristics Associated With Initiation of E-cigarette, Combustible Cigarette, and Dual-Product Use at 12-Month Follow-Up Among US Youth Reporting No Lifetime Nicotine- and/or Tobacco-Product Use at Baseline in the PATH Study, 2013–2015, With Mental Health Problems Included as a Single Variable

Predictor	Neither (n = 7154), %				E-cigarettes Only (n = 316)				Combustible Cigarettes Only (n = 122)				Dual Use (n = 110)			
	%	Initiating	RRR (95% CI)	aRRR (95% CI)	%	Initiating	RRR (95% CI)	aRRR (95% CI)	%	Initiating	RRR (95% CI)	aRRR (95% CI)	%	Initiating	RRR (95% CI)	aRRR (95% CI)
Mental health problems																
Both low	97.2	1.6	Reference	Reference	0.3	Reference	Reference	Reference	0.9	Reference	Reference	Reference	0.9	Reference	Reference	Reference
High externalizing, low internalizing	92.6	4.4	2.87 (1.82–4.52)	2.58 (1.63–4.08)	1.6	5.24 (1.81–15.13)*	5.09 (1.79–14.53)	5.09 (1.79–14.53)	1.4	1.60 (0.77–3.33)	1.45 (0.68–3.06)	1.45 (0.68–3.06)	1.4	1.60 (0.77–3.33)	1.45 (0.68–3.06)	1.45 (0.68–3.06)
Low externalizing, high internalizing	95.9	2.7	1.67 (0.89–3.10)	1.54 (0.82–2.87)	0.8	2.63 (0.68–10.11)	2.31 (0.58–9.23)	2.31 (0.58–9.23)	0.6	0.70 (0.20–2.42)	0.57 (0.16–2.03)	0.57 (0.16–2.03)	0.6	0.70 (0.20–2.42)	0.57 (0.16–2.03)	0.57 (0.16–2.03)
Both high	89.0	6.3	4.25 (2.83–6.38)	3.69 (2.41–5.63)	2.7	9.35 (3.83–22.82)*	7.82 (3.16–19.33)	7.82 (3.16–19.33)	2.1	2.49 (1.46–4.23)*	1.82 (1.04–3.19)*	1.82 (1.04–3.19)*	2.1	2.49 (1.46–4.23)*	1.82 (1.04–3.19)*	1.82 (1.04–3.19)*
Sex																
Female	92.6	3.9	Reference	Reference	1.8	Reference	Reference	Reference	1.6	Reference	Reference	Reference	1.6	Reference	Reference	Reference
Male	93.0	4.4	1.11 (0.87–1.43)	1.26 (0.97–1.65)	1.3	0.71 (0.48–1.05)	0.85 (0.57–1.26)	0.85 (0.57–1.26)	1.3	0.78 (0.50–1.20)	0.87 (0.55–1.38)	0.87 (0.55–1.38)	1.3	0.78 (0.50–1.20)	0.87 (0.55–1.38)	0.87 (0.55–1.38)
Age, y																
12–14	94.3	3.3	Reference	Reference	1.3	Reference	Reference	Reference	1.1	Reference	Reference	Reference	1.1	Reference	Reference	Reference
15–17	90.1	5.7	1.79 (1.43–2.25)	1.46 (1.16–1.83)	2.0	1.56 (1.10–2.21)*	1.16 (0.80–1.68)	1.16 (0.80–1.68)	2.2	2.13 (1.44–3.13)*	1.61 (1.05–2.46)*	1.61 (1.05–2.46)*	2.2	2.13 (1.44–3.13)*	1.61 (1.05–2.46)*	1.61 (1.05–2.46)*
Race																
White	91.9	4.7	Reference	Reference	1.7	Reference	Reference	Reference	1.7	Reference	Reference	Reference	1.7	Reference	Reference	Reference
African American	95.7	2.4	0.50 (0.33–0.74)	0.52 (0.35–0.76)	1.6	0.80 (0.47–1.36)	0.76 (0.45–1.29)	0.76 (0.45–1.29)	0.4	0.23 (0.08–0.62)*	0.22 (0.08–0.61)*	0.22 (0.08–0.61)*	0.4	0.23 (0.08–0.62)*	0.22 (0.08–0.61)*	0.22 (0.08–0.61)*
Other	94.3	3.5	0.73 (0.52–1.02)	0.75 (0.53–1.07)	0.8	0.45 (0.25–0.80)*	0.44 (0.24–0.79)*	0.44 (0.24–0.79)*	1.4	0.82 (0.43–1.58)	0.82 (0.42–1.60)	0.82 (0.42–1.60)	1.4	0.82 (0.43–1.58)	0.82 (0.42–1.60)	0.82 (0.42–1.60)
Parent education level																
Less than high school	93.4	3.6	Reference	Reference	1.9	Reference	Reference	Reference	1.1	Reference	Reference	Reference	1.1	Reference	Reference	Reference
High school	91.3	4.4	1.26 (0.82–1.95)	1.09 (0.71–1.68)	2.1	1.13 (0.63–2.05)	0.93 (0.52–1.68)	0.93 (0.52–1.68)	2.2	1.94 (0.96–3.94)	1.69 (0.82–3.49)	1.69 (0.82–3.49)	2.2	1.94 (0.96–3.94)	1.69 (0.82–3.49)	1.69 (0.82–3.49)
Some college	92.3	4.3	1.21 (0.85–1.73)	1.03 (0.72–1.49)	1.7	0.89 (0.53–1.48)	0.73 (0.43–1.22)	0.73 (0.43–1.22)	1.7	1.56 (0.84–2.90)	1.40 (0.76–2.57)	1.40 (0.76–2.57)	1.7	1.56 (0.84–2.90)	1.40 (0.76–2.57)	1.40 (0.76–2.57)
Bachelor's degree	93.4	4.6	1.30 (0.84–2.00)	1.02 (0.65–1.58)	1.0	0.50 (0.24–1.05)	0.39 (0.19–0.79)*	0.39 (0.19–0.79)*	1.0	0.92 (0.43–2.00)	0.72 (0.33–1.60)	0.72 (0.33–1.60)	1.0	0.92 (0.43–2.00)	0.72 (0.33–1.60)	0.72 (0.33–1.60)
More than bachelor's degree	94.3	3.7	1.03 (0.63–1.69)	0.82 (0.50–1.34)	1.0	0.53 (0.23–1.22)	0.44 (0.19–1.03)	0.44 (0.19–1.03)	0.9	0.81 (0.32–2.06)	0.65 (0.25–1.70)	0.65 (0.25–1.70)	0.9	0.81 (0.32–2.06)	0.65 (0.25–1.70)	0.65 (0.25–1.70)
Past-year marijuana use																
No	93.3	4.0	Reference	Reference	1.4	Reference	Reference	Reference	1.3	Reference	Reference	Reference	1.3	Reference	Reference	Reference
Yes	66.1	12.5	4.39 (2.48–7.76)	1.74 (0.87–3.48)	10.7	10.69 (5.39–21.20)	4.59 (2.01–10.47)	4.59 (2.01–10.47)	10.6	11.57 (5.96–22.47)	4.60 (2.11–10.02)	4.60 (2.11–10.02)	10.6	11.57 (5.96–22.47)	4.60 (2.11–10.02)	4.60 (2.11–10.02)
Past-year alcohol use																
No	93.9	3.6	Reference	Reference	1.3	Reference	Reference	Reference	1.2	Reference	Reference	Reference	1.2	Reference	Reference	Reference
Yes	78.0	11.9	4.00 (2.77–5.77)	2.63 (1.72–4.02)	5.0	4.60 (2.90–7.28)*	2.34 (1.32–4.12)*	2.34 (1.32–4.12)*	5.1	5.15 (3.13–8.48)*	2.64 (1.45–4.80)*	2.64 (1.45–4.80)*	5.1	5.15 (3.13–8.48)*	2.64 (1.45–4.80)*	2.64 (1.45–4.80)*

All percentages are weighted to be representative of adolescents ages 12–17 y by using the wave 2 replicate weights. Adjusted models are simultaneously adjusted for all covariates in the analysis.
* Statistical significance at $P < .05$.

SUPPLEMENTAL TABLE 5 Characteristics Associated With Initiation of E-Cigarette, Combustible Cigarette, and Dual-Product Use at 12-Month Follow-Up Among US Youth Reporting No Lifetime Nicotine- and/or Tobacco-Product Use at Baseline in the PATH Study, 2013–2015, After Multiple Imputation With Chained Equations

Predictor	Neither (n = 7698), %				E-cigarettes Only (n = 329)				Combustible Cigarettes Only (n = 124)				Dual Use (n = 118)			
	% Initiating	RRR (95% CI)	aRRR (95% CI)	Reference	% Initiating	RRR (95% CI)	aRRR (95% CI)	Reference	% Initiating	RRR (95% CI)	aRRR (95% CI)	Reference	% Initiating	RRR (95% CI)	aRRR (95% CI)	
Internalizing problems																
Low	95.5	2.6	Reference	Reference	0.8	Reference	Reference	Reference	1.1	Reference	Reference	Reference	1.1	Reference	Reference	Reference
Moderate	92.6	4.5	1.75 (1.29–2.39)*	1.24 (0.92–1.68)	1.6	2.14 (1.52–3.48)*	1.24 (0.92–1.68)	1.26 (0.74–2.13)	1.3	2.14 (1.52–3.48)*	0.86 (0.53–1.42)	0.86 (0.53–1.42)	1.3	1.25 (0.79–1.97)	0.86 (0.53–1.42)	0.86 (0.53–1.42)
High	87.0	7.2	3.00 (2.21–4.08)*	1.63 (1.14–2.33)*	3.2	4.45 (2.75–7.15)*	1.63 (1.14–2.33)*	1.64 (0.90–3.00)	2.6	4.45 (2.75–7.15)*	2.31 (1.22–4.39)*	2.31 (1.22–4.39)*	2.6	2.71 (1.72–4.28)*	1.21 (0.70–2.10)	1.21 (0.70–2.10)
Externalizing problems																
Low	97.0	1.8	Reference	Reference	0.4	Reference	Reference	Reference	0.8	Reference	Reference	Reference	0.8	Reference	Reference	Reference
Moderate	92.8	4.4	2.61 (1.84–3.71)*	2.21 (1.51–3.22)*	1.4	3.56 (1.83–6.90)*	2.21 (1.51–3.22)*	3.07 (1.53–6.13)*	1.4	3.56 (1.83–6.90)*	1.61 (0.92–2.82)	1.61 (0.92–2.82)	1.4	1.76 (1.04–2.97)*	1.61 (0.92–2.82)	1.61 (0.92–2.82)
High	88.1	6.7	4.16 (2.85–6.05)*	2.81 (1.80–4.39)*	2.9	7.62 (4.14–14.04)*	2.81 (1.80–4.39)*	5.11 (2.50–10.46)*	2.4	7.62 (4.14–14.04)*	2.31 (1.22–4.39)*	2.31 (1.22–4.39)*	2.4	3.18 (1.90–5.31)*	2.31 (1.22–4.39)*	2.31 (1.22–4.39)*
Sex																
Female	92.9	3.7	Reference	Reference	1.7	Reference	Reference	Reference	1.6	Reference	Reference	Reference	1.6	Reference	Reference	Reference
Male	93.4	4.3	1.15 (0.91–1.45)	1.33 (1.03–1.72)*	1.3	0.72 (0.50–1.06)	1.33 (1.03–1.72)*	0.87 (0.58–1.31)	1.3	0.72 (0.50–1.06)	0.88 (0.57–1.34)	0.88 (0.57–1.34)	1.3	0.77 (0.51–1.17)	0.88 (0.57–1.34)	0.88 (0.57–1.34)
Age, y																
12–14	94.5	3.2	Reference	Reference	1.3	Reference	Reference	Reference	1.1	Reference	Reference	Reference	1.1	Reference	Reference	Reference
15–17	90.3	5.6	1.84 (1.49–2.29)*	1.50 (1.21–1.86)*	1.9*	1.55 (1.10–2.20)*	1.50 (1.21–1.86)*	1.17 (0.81–1.69)	2.2	1.55 (1.10–2.20)*	1.61 (1.08–2.40)*	1.61 (1.08–2.40)*	2.2	2.12 (1.47–3.07)*	1.61 (1.08–2.40)*	1.61 (1.08–2.40)*
Race																
White	92.2	4.5	Reference	Reference	1.6	Reference	Reference	Reference	1.7	Reference	Reference	Reference	1.7	Reference	Reference	Reference
African American	95.8	2.3	0.49 (0.33–0.72)*	0.51 (0.35–0.75)*	1.4	0.85 (0.52–1.42)	0.51 (0.35–0.75)*	0.83 (0.49–1.39)	0.4	0.85 (0.52–1.42)	0.24 (0.10–0.58)*	0.24 (0.10–0.58)*	0.4	0.25 (0.11–0.59)*	0.24 (0.10–0.58)*	0.24 (0.10–0.58)*
Other	94.2	3.6	0.77 (0.55–1.09)	0.80 (0.57–1.13)	0.8	0.49 (0.28–0.85)	0.80 (0.57–1.13)	0.50 (0.28–0.87)	1.4	0.49 (0.28–0.85)	0.86 (0.49–1.53)	0.86 (0.49–1.53)	1.4	0.85 (0.48–1.50)	0.86 (0.49–1.53)	0.86 (0.49–1.53)
Parent education level																
Less than high school	93.6	3.3	Reference	Reference	1.8	Reference	Reference	Reference	1.3	Reference	Reference	Reference	1.3	Reference	Reference	Reference
High school	91.7	4.2	1.28 (0.83–1.98)	1.11 (0.72–1.73)	2.1	1.17 (0.65–2.10)	1.11 (0.72–1.73)	0.98 (0.55–1.74)	2.0	1.17 (0.65–2.10)	1.41 (0.76–2.62)	1.41 (0.76–2.62)	2.0	1.62 (0.88–2.96)	1.41 (0.76–2.62)	1.41 (0.76–2.62)
Some college	92.3	4.3	1.30 (0.92–1.85)	1.10 (0.77–1.58)	1.6	0.88 (0.53–1.47)	1.10 (0.77–1.58)	0.71 (0.43–1.19)	1.8	0.88 (0.53–1.47)	1.26 (0.76–2.09)	1.26 (0.76–2.09)	1.8	1.44 (0.86–2.39)	1.26 (0.76–2.09)	1.26 (0.76–2.09)
Bachelor's degree	93.7	4.4	1.31 (0.86–2.00)	1.03 (0.67–1.58)	1.0	0.54 (0.27–1.07)	1.03 (0.67–1.58)	0.42 (0.21–0.83)*	1.0	0.54 (0.27–1.07)	0.60 (0.30–1.22)	0.60 (0.30–1.22)	1.0	0.77 (0.39–1.52)	0.60 (0.30–1.22)	0.60 (0.30–1.22)
More than bachelor's degree	94.7	3.5	1.02 (0.63–1.66)	0.81 (0.50–1.33)	1.0	0.53 (0.25–1.11)	0.81 (0.50–1.33)	0.44 (0.21–0.95)*	0.9	0.53 (0.25–1.11)	0.54 (0.22–1.31)	0.54 (0.22–1.31)	0.9	0.68 (0.29–1.61)	0.54 (0.22–1.31)	0.54 (0.22–1.31)
Past-year marijuana use																
No	93.5	4.0	Reference	Reference	1.3	Reference	Reference	Reference	1.3	Reference	Reference	Reference	1.3	Reference	Reference	Reference
Yes	67.2	12.1	4.30 (2.42–7.64)*	1.64 (0.82–3.28)	10.3	10.69 (5.63–21.31)*	1.64 (0.82–3.28)	4.19 (1.91–9.18)*	10.5	10.69 (5.63–21.31)*	4.25 (1.96–9.21)*	4.25 (1.96–9.21)*	10.5	11.28 (5.90–21.59)*	4.25 (1.96–9.21)*	4.25 (1.96–9.21)*
Past-year alcohol use																
No	94.1	3.5	Reference	Reference	1.2	Reference	Reference	Reference	1.2	Reference	Reference	Reference	1.2	Reference	Reference	Reference
Yes	78.3	11.8	4.06 (2.86–5.75)*	2.52 (1.68–3.77)*	4.9	4.71 (3.02–7.35)*	2.52 (1.68–3.77)*	2.22 (1.30–3.82)*	5.1	4.71 (3.02–7.35)*	2.48 (1.40–4.38)*	2.48 (1.40–4.38)*	5.1	5.15 (3.21–8.24)*	2.48 (1.40–4.38)*	2.48 (1.40–4.38)*

All percentages are weighted to be representative of adolescents ages 12–17 y by using the Taylor series method. Adjusted models are simultaneously adjusted for all covariates in the analysis.
* Statistical significance at $P < .05$.