Effects of Psychiatric Disorders on Suicide Attempt: Similarities and Differences Between Older and Younger Adults in a National Cohort Study

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ABSTRACT

Objective: Several common psychiatric disorders are associated with increased risk of suicide attempts, and the strength of these associations may vary between younger and older adults, which may explain age differences in suicide risk. Because psychiatric disorders often co-occur, it remains unclear whether (1) the risk of suicide attempt in older and younger adults is due to specific psychiatric disorders or underlying psychopathology dimensions (ie, internalizing and externalizing dimensions) and (2) the extent to which individual psychiatric disorders make distinct contributions to suicide attempt risk varies by age.

Methods: In a large nationally representative longitudinal survey, the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC; Wave 1, 2001–2002; Wave 2, 2004–2005), multiple-group structural equation modeling was used to examine shared and specific effects of *DSM-IV-TR* Axis I and Axis II disorders on the 3-year occurrence of suicide attempts in 4 different age groups (18–30 years, 31–40 years, 41–49 years, and ≥ 50 years).

Results: The study population included 34,653 individuals. In each age group, effect of psychiatric disorders on risk of attempting suicide was almost exclusively mediated through a general psychopathology factor representing the shared effect across all disorders ($P < .01$). The magnitude of this effect was significantly lower in older than in younger adults ($P < .05$). No individual disorder had significant additional effects on attempt risk.

Conclusions: These findings underscore the importance of assessing suicide attempt risk in patients at all ages who present with common psychiatric disorders and the need for prevention strategies focused on the general psychopathology dimension.

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Suicide continues to be a leading cause of preventable death worldwide.[1] Prior research suggests substantial age differences in suicide and suicide attempt rates.[2–6] Although adults aged 65 years or older attempt suicide less often than younger ones, they have a higher completion rate, accounting for 16.4% of all suicides in the United States despite representing only 13.8% of the population.[7] For all ages combined, there is an estimated 1 suicide for every 100–200 attempts. Over the age of 65, there is an estimated 1 suicide for every 4 attempted suicides. Understanding factors contributing to these age differences in suicide risk may help refine prevention measures to address this major public health issue.[2,8–11]

Psychiatric disorders are among the strongest predictors of suicide and suicide attempt at all ages.[12–17] Several epidemiologic studies[2,3,16,18,19] have suggested age differences in the associations between common psychiatric disorders and the risk of suicide that might contribute to these age differences in suicide risk. Particularly, while the prevalence of most psychiatric disorders is lower in older than in younger adults,[20] prior studies suggest that major depression may be associated with a stronger risk of suicide in older than in younger adults.[2,3,16,18,19]

However, anxiety, mood, substance use, and personality disorders often co-occur,[15,21–25] and prior studies[15,23,26] have suggested that transdiagnostic factors (eg, internalizing and externalizing dimensions), representing mechanisms shared by comorbid disorders, may account for links between individual disorders and suicide-related outcomes. To our knowledge, the utility of these transdiagnostic factors to predict the risk of suicide attempts has never been examined in different age groups. If the extent to which individual psychiatric disorders make distinct contributions to suicide attempt risk varies by age, then interventions might best target priority disorders with the greatest contribution to suicide risk in each age group. By contrast, if the risk is mostly mediated through the same transdiagnostic factor in all age groups, interventions that target this factor may have greater impact on suicide risk reduction than disorder-specific interventions at all ages.[8]

Clinical Points

- Because psychiatric disorders often co-occur and comorbidity patterns as well as suicide risk vary across the lifespan, it remains unclear whether (1) suicide attempt risk in older and younger adults is due to specific psychiatric disorders or underlying psychopathology dimensions (ie, internalizing and externalizing) and (2) the extent to which individual psychiatric disorders make distinct contributions to suicide attempt risk varies by age.
- In a large, nationally representative longitudinal survey, effects of psychiatric disorders on the risk of suicide attempt were almost exclusively mediated through a general psychopathology factor representing the shared effect across all disorders, and the magnitude of this effect was significantly greater in younger than in older adults.
- These findings underscore the importance of assessing suicide attempt risk in patients of all ages who present with common psychiatric disorders and the need for prevention strategies focused on the general psychopathology dimension.

Aiming to fill this gap of knowledge, this prospective study examines the shared and specific effects of several common *DSM-IV* Axis I and Axis II disorders on the 3-year risk for suicide attempt in 4 different age groups (ie, 18–30 years, 31–40 years, 41–49 years, and ≥ 50 years). To model psychiatric disorder comorbidity, we used a bifactor latent variable approach to disentangle effects shared by all psychiatric disorders (ie, the general psychopathology dimension), those specific to dimensions of psychopathology (eg, internalizing and externalizing dimensions), and those specific to psychiatric disorders (eg, major depressive episode). In this report, we focused on suicide attempt because it is one of the strongest predictors of completed suicide,[27,28] is an indicator of extreme emotional distress,[29] and is itself associated with considerable burden.[30]

METHODS

Sample

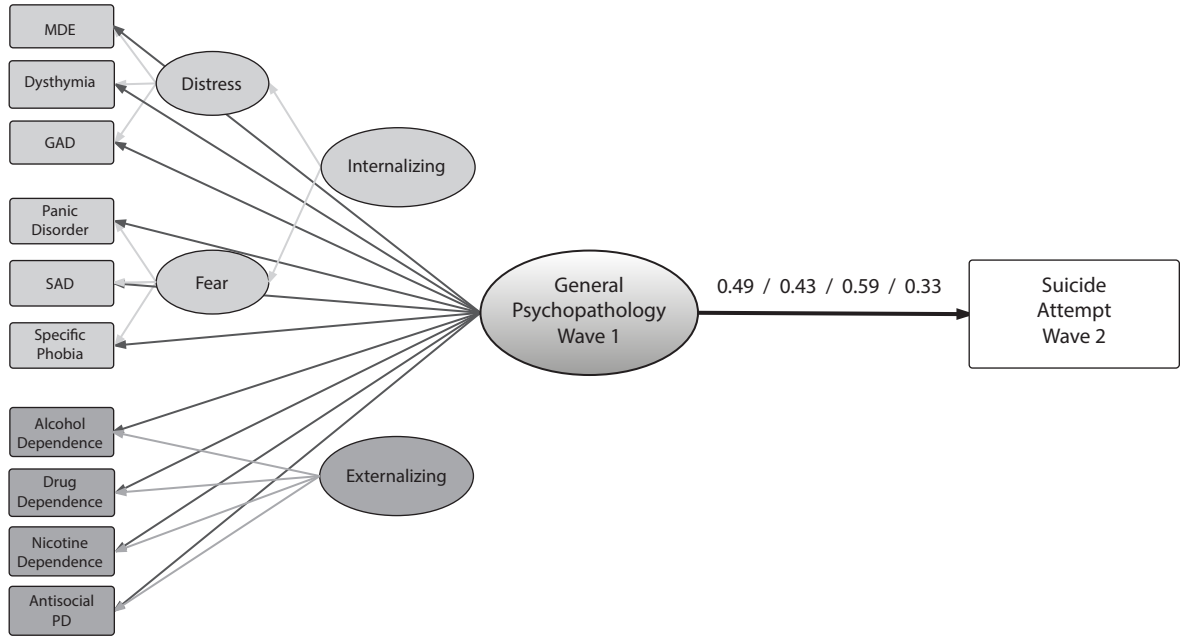
Data were drawn from Wave 1 and Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a nationally representative face-to-face survey of the US adult population, conducted in 2001–2002 (Wave 1) and 2004–2005 (Wave 2) by the National Institute on Alcoholism and Alcohol Abuse (NIAAA).[31] The target population included the civilian non-institutionalized population, aged 18 years and older, residing in the United States. The Wave 2 NESARC data were weighted to adjust for nonresponse, demographic factors, and psychiatric diagnoses to ensure that the Wave 2 sample approximated the target population, that is, the original sample minus attrition between the two waves.[31] The research protocol, including written informed consent procedures, received full human subjects review and approval from the US Census Bureau and the Office of Management and Budget.[31,32] The present analysis includes the 34,653 participants who completed interviews at both waves. Age-group cutoffs (ie, 18–30, 31–40, 41–49, and ≥ 50 years) were determined based on a preliminary analysis of the age distribution of suicide attempts, assuming that we needed at least 40 suicide attempts by age group for adequate statistical power. Number of participants and mean age of each age group are given in Table 1.

Table 1. Frequency Distributions of Psychiatric Disorders in Individuals Who Attempted Suicide During the 3-Year Follow-Up Period and in Non-Attempters, by Age Group[a]

Variable	18–30 y (n = 7,405)		31–40 y (n = 7,438)		41–49 y (n = 6,321)		≥ 50 y (n = 13,489)	
Age, mean (SE), y	24.1 (3.8)		35.7 (2.9)		44.9 (2.6)		64.2 (10.4)	
Psychiatric disorder, % (SE)	Attempters (n = 77)	Non-Attempters (n = 7,328)	Attempters (n = 73)	Non-Attempters (n = 7,365)	Attempters (n = 63)	Non-Attempters (n = 6,258)	Attempters (n = 40)	Non-Attempters (n = 13,449)
Any Axis I or II disorder	75.0 (5.8)	40.6 (1.0)	60.4 (8.3)	35.0 (0.9)	81.2 (5.4)	34.5 (1.0)	49.7 (9.8)	24.7 (0.6)
Any Axis I disorder	70.2 (6.1)	34.3 (0.9)	60.4 (8.3)	28.1 (0.9)	77.6 (6.0)	28.8 (0.9)	40.2 (8.5)	19.0 (0.5)
Any Axis II disorder	52.8 (7.2)	19.0 (0.6)	35.6 (7.3)	16.6 (0.7)	53.8 (8.5)	15.4 (0.6)	35.3 (9.7)	10.7 (0.4)
Major depressive episode	46.1 (7.1)	9.6 (0.5)	30.3 (7.1)	7.0 (0.4)	39.2 (7.4)	7.5 (0.4)	22.2 (4.5)	4.6 (0.2)
Dysthymia	17.7 (4.9)	1.6 (0.2)	9.8 (3.6)	1.6 (0.2)	28.0 (7.6)	2.0 (0.2)	9.2 (4.8)	1.4 (0.1)
Mania/hypomania	27.2 (6.9)	6.0 (0.4)	13.8 (4.4)	2.7 (0.2)	18.4 (5.3)	1.9 (0.2)	9.1 (4.8)	1.2 (0.1)
Panic disorder	12.3 (4.4)	2.3 (0.2)	17.7 (5.7)	2.7 (0.2)	17.0 (7.3)	2.4 (0.2)	5.1 (25)	1.4 (0.1)
Social anxiety disorder	6.5 (3.2)	3.2 (0.3)	20.8 (6.5)	3.0 (0.3)	20.3 (8.0)	2.9 (0.2)	7.0 (3.8)	2.1 (0.2)
Specific phobia	20.7 (6.0)	8.1 (0.5)	13.1 (4.4)	7.6 (0.5)	19.4 (8.0)	7.8 (0.4)	10.5 (5.2)	5.9 (0.3)
GAD	17.5 (6.1)	2.2 (0.2)	14.5 (4.5)	2.1 (0.2)	21.3 (6.9)	2.5 (0.2)	9.5 (4.3)	1.5 (0.1)
Alcohol dependence	19.1 (6.4)	8.5 (0.5)	18.3 (6.4)	3.8 (0.3)	12.4 (3.8)	2.4 (0.2)	2.7 (1.7)	0.7 (0.1)
Drug dependence	8.8 (4.5)	1.4 (0.2)	5.1 (2.8)	0.5 (0.1)	5.6 (2.8)	0.3 (0.1)	0.0	0.1 (0.03)
Nicotine dependence	33.7 (6.5)	16.0 (0.7)	34.0 (6.9)	14.0 (0.7)	47.0 (7.5)	13.7 (0.6)	14.3 (5.5)	7.9 (0.3)
Pathological gambling	0.3 (0.3)	0.3 (0.1)	0.4 (0.4)	0.1 (0.03)	2.0 (1.9)	0.2 (0.1)	0.0	0.1 (0.03)
Antisocial PD	20.5 (6.3)	5.9 (0.4)	7.7 (3.2)	4.4 (0.3)	9.8 (3.6)	3.1 (0.3)	7.2 (3.2)	1.7 (0.1)
Avoidant PD	27.8 (6.6)	3.2 (0.3)	21.5 (6.3)	2.5 (0.2)	13.4 (4.0)	2.4 (0.2)	11.3 (5.0)	1.3 (0.1)
OCPD	16.7 (5.5)	8.3 (0.4)	15.7 (4.6)	9.4 (0.5)	28.2 (8.1)	8.4 (0.4)	17.2 (7.0)	6.7 (0.3)
Schizoid PD	13.9 (5.2)	3.8 (0.3)	24.4 (6.6)	3.2 (0.3)	27.1 (7.9)	3.1 (0.2)	1.2 (1.2)	2.4 (0.2)
Dependent PD	7.9 (4.3)	0.8 (0.1)	10.6 (5.4)	0.2 (0.1)	3.4 (2.2)	0.4 (0.1)	3.8 (3.7)	0.2 (0.1)
Paranoid PD	33.7 (7.1)	6.4 (0.4)	17.3 (4.8)	5.0 (0.4)	28.5 (7.1)	4.0 (0.3)	12.3 (5.1)	2.4 (0.2)
Histrionic PD	12.7 (5.1)	3.7 (0.3)	3.2 (2.2)	1.7 (0.2)	9.2 (4.1)	1.3 (0.1)	1.8 (1.3)	0.8 (0.1)

[a]Percentages are weighted.
Abbreviations: GAD = generalized anxiety disorder, OCPD = obsessive-compulsive personality disorder, PD = personality disorder.

Figure 1. Multiple-Group (by Age Group) Bifactor Model of the Distress-Fear-Externalizing Structure Testing the Shared and Specific Effects of Psychiatric Disorders Assessed at Wave 1 on the 3-Year Occurrence of Suicide Attempt in the General Population[a]



[a]Ellipses are used to denote latent constructs, and rectangles are used to denote the observed variables measuring or impacting on these constructs. The bifactor model parses disorder variance into general variance (ie, variance of the general psychopathology factor), variance of dimensions of psychopathology (eg, variance of the externalizing dimension), and unique variance (variance of each mental disorder per se). Regression coefficients shown for each age group (ie, 18–30 years, 31–40 years, 41–49 years, and ≥ 50 years) are standardized and adjusted for marital status, household income, race/ethnicity, sex, and lifetime history of suicide attempt at Wave 1. Standardized estimates of the relationship between suicide attempt and each latent factor indicate how many standard deviations higher (or lower) the mean of the latent variable underlying the binary outcome are expected to be for each increase in an additional unit of that latent factor while adjusting for the other factors. Only significant effects (2-sided $P < .05$) are represented in the model. There is no other dimension of psychopathology or disorder with modification index greater than or equal to 10 to additionally predict suicide attempt.

Abbreviations: GAD = generalized anxiety disorder, MDE = major depressive episode, PD = personality disorder, SAD = social anxiety disorder.

Assessments of *DSM-IV* Past-Year Axis I and Lifetime Axis II Diagnoses at Wave 1

Psychiatric disorders were assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule, *DSM-IV* version (AUDADIS-IV), a structured diagnostic instrument administered by trained lay interviewers.[31] Axis I diagnoses included substance use disorders (alcohol, drug, and nicotine dependence), mood disorders (major depressive episode, dysthymic disorder, mania, and hypomania), anxiety disorders (specific phobia, panic, social anxiety, and generalized anxiety disorders), and pathological gambling. For all Axis I disorders, diagnoses were made in the past 12 months prior to Wave 1. Axis II disorders (including avoidant, dependent, obsessive-compulsive, histrionic, paranoid, schizoid, and antisocial personality disorders) were assessed at Wave 1 on a lifetime basis.[31] The test-retest reliability and validity of AUDADIS-IV measures of *DSM-IV* mental disorders are good to excellent for substance use disorders and fair to good for other disorders.[32–34]

Suicide Attempt Assessment

To assess for incident cases of suicide attempt, all Wave 2 respondents were asked, "Since last interview, did you ever attempt suicide?" To assess lifetime suicide attempt at baseline, respondents who experienced any lifetime history of 2-week episode of depressed mood and/or anhedonia were asked whether they had ever attempted suicide.

Sociodemographic Characteristics in Wave 1

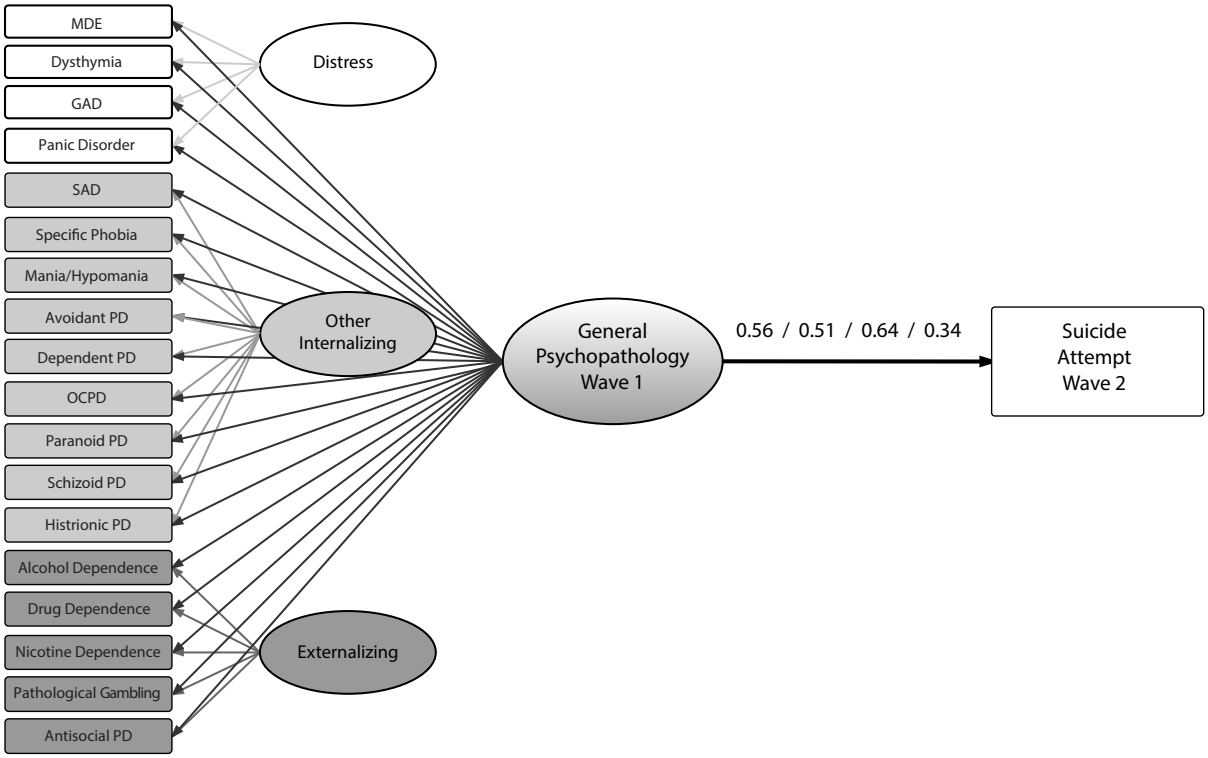
Sociodemographic characteristics included age, sex, marital status (ie, married or living as if married versus not), race/ethnicity (white versus non-white), and household income in the past year (< $20,000; $20,000–$34,999; $35,000–$69,999, and > $70,000).

Statistical Analysis

Weighted percentages and their corresponding standard errors were calculated to provide descriptive information about the relationships of past-year Axis I disorders and lifetime Axis II disorders assessed at Wave 1 with suicide attempt occurrence between the two waves in each age group. Odds ratios and their 95% confidence intervals were calculated to provide information on incident suicide attempts within each age group with each psychiatric disorder.

Next, we used confirmatory factor analysis (CFA) to identify the latent structure underlying past–12-month individual psychiatric disorders assessed at Wave 1. We

Figure 2. Multiple-Group (by Age Group) Bifactor Model of the Distress–Other Internalizing–Externalizing Structure Testing the Shared and Specific Effects of Psychiatric Disorders on the 3-Year Occurrence of Suicide Attempt in the General Population[a]



[a]Ellipses are used to denote latent constructs, and rectangles are used to denote the observed variables measuring or impacting on these constructs. The bifactor model parses disorder variance into general variance (ie, variance of the general psychopathology factor), variance of dimensions of psychopathology (eg, variance of the externalizing dimension), and unique variance (variance of each mental disorder per se). Regression coefficients shown for each age group (ie, 18–30 years, 31–40 years, 41–49 years, and ≥ 50 years) are standardized and adjusted for marital status, household income, race/ethnicity, sex, and lifetime history of suicide attempt at Wave 1. Standardized estimates of the relationship between suicide attempt and each latent factor indicate how many standard deviations higher (or lower) the mean of the latent variable underlying the binary outcome are expected to be for each increase in an additional unit of that latent factor while adjusting for the other factors. Only significant effects (2-sided $P < .05$) are represented in the model. There is no other dimension of psychopathology or disorder with modification index greater than or equal to 10 to additionally predict suicide attempt.

Abbreviations: GAD = generalized anxiety disorder, MDE = major depressive episode, OCPD = obsessive-compulsive personality disorder, PD = personality disorder, SAD = social anxiety disorder.

built upon the CFA model fit by Krueger et al,[20,35,36] which comprises an internalizing dimension (measured by the distress and fear factors representing the shared effects of mood and anxiety disorders) and an externalizing dimension (measured by substance use disorders and antisocial personality disorder), and performed a bifactor CFA model in each age group (Figure 1 and Supplementary Table 1).[15] An advantage of performing a bifactor model is that it comprises a general psychopathology factor that accounts for a good deal of the significantly positive covariance between the internalizing and externalizing dimensions, is independent of these dimensions, and saturates each psychiatric disorder diagnosis directly.[37] We examined measures of goodness-of-fit: comparative fit index (CFI) and Tucker-Lewis Index (TLI) values greater than 0.95 and root mean squared error of approximation (RMSEA) less than 0.06 were used to indicate good model fit.[38]

Finally, after confirming that the measurement parameters of the bifactor models were age-invariant,[20] we used a multiple-group (by the 4 age groups) structural equation model to assess shared and specific effects of psychiatric disorders assessed at Wave 1 on the 3-year risk of suicide attempt, adjusting for prior suicide attempt and sociodemographic characteristics (race/ethnicity, sex, marital status, and household income).

Standardized probit estimates of the relationship between suicide attempt and each latent factor indicate how many standard deviations higher (or lower) the mean of the latent variable underlying the binary outcome are expected to be for each increase in an additional unit of that latent factor while adjusting for the other factors. To determine if specific disorders predicted incident suicide attempts above and beyond the association with the latent variables and the effects of other factors, modification indices (χ^2 tests with 1 degree of freedom) were examined to test if any residuals were correlated with the risk of suicide attempt by age group. Differences in the magnitude of coefficients across age groups were examined using Wald χ^2 tests within the multiple-group bifactor model.[39] R-squared values representing the percent of outcome variance explained by the models

Table 2. Associations of Psychiatric Disorders With the 3-Year-Risk of Suicide Attempt, by Age Group

Variable	18–30 y	31–40 y	41–49 y	≥ 50 y
Age, mean (SE), y	24.1 (3.8)	35.7 (2.9)	44.9 (2.6)	64.2 (10.4)
Mental disorder, OR (95% CI)				
Any Axis I or II disorder	4.4 (2.4–8.0)***	2.8 (1.5–5.6)***	8.2 (4.1–16.5)***	3.0 (1.4–6.6)**
Any Axis I disorder	4.5 (2.6–8.0)***	3.9 (2.0–7.7)***	8.6 (4.3–16.9)***	2.9 (1.4–5.8)***
Any Axis II disorder	4.8 (2.7–8.5)***	2.8 (1.5–5.2)***	6.4 (3.2–12.7)***	4.6 (2.0–10.6)***
Major depressive episode	8.1 (4.6–14.2)***	5.8 (3.0–11.3)***	8.3 (4.2–16.5)***	6.0 (2.5–14.1)***
Dysthymia	13.2 (6.4–27.4)***	6.6 (2.9–15.0)***	20.3 (8.7–47.1)***	7.4 (2.4–22.7)***
Mania/hypomania	5.8 (2.9–11.7)***	5.7 (2.8–11.7)***	11.4 (5.1–25.4)***	8.6 (2.7–27.3)***
Panic disorder	5.9 (2.6–13.4)***	7.9 (3.6–17.4)***	8.2 (2.5–26.8)***	3.9 (1.4–11.0)**
Social anxiety disorder	2.1 (0.7–6.2)	8.4 (3.8–18.58)***	9.4 (3.4–25.8)***	NA
Specific phobia	3.0 (1.5–6.0)***	1.8 (0.9–4.0)	3.4 (1.2–9.8)*	NA
GAD	9.7 (4.1–22.8)***	8.0 (3.9–16.4)***	10.7 (4.2–27.5)***	7.1 (2.6–19.4)***
Alcohol dependence	2.5 (1.1–5.8)*	5.9 (2.6–13.5)***	5.5 (2.5–11.9)***	NA
Drug dependence	6.8 (2.1–21.7)***	NA	NA	NA
Nicotine dependence	2.7 (1.5–4.7)***	3.2 (1.8–5.8)***	6.4 (3.4–12.0)***	2.0 (0.8–4.8)
Pathological gambling	NA	NA	NA	NA
Antisocial PD	4.1 (1.9–8.9)***	1.8 (0.7–4.4)	3.3 (1.3–8.1)**	4.5 (1.7–11.8)***
Avoidant PD	11.8 (6.0–23.3)***	10.9 (5.2–23.1)***	6.2 (2.9–13.2)***	9.5 (3.5–25.8)***
OCPD	2.2 (1.0–4.9)*	1.8 (0.9–3.6)	4.5 (1.9–10.6)***	2.9 (1.1–7.7)*
Schizoid PD	4.1 (1.8–9.7)**	9.9 (4.8–20.3)***	15.7 (6.8–36.4)***	NA
Dependent PD	11.3 (3.3–39.3)***	NA	NA	NA
Paranoid PD	7.4 (3.9–14.0)***	4.0 (2.1–7.7)***	10.2 (4.8–21.8)***	5.8 (2.3–14.8)***
Histrionic PD	3.8 (1.5–9.7)**	NA	NA	NA

*$P < .05$.
**$P < .01$.
***$P < .005$.
Abbreviations: GAD = generalized anxiety disorder, NA = not applicable, OCPD = obsessive-compulsive personality disorder, OR = odds ratio, PD = personality disorder.

were calculated. Statistical significance was evaluated using a 2-sided α of .05. Weighted percentages and binary logistic regressions were performed using SUDAAN 10.0.1 software (RTI International, Research Park, North Carolina). Structural equation modeling analyses were conducted using Mplus Version 7.3.[39] The default estimator for the analysis was the variance-adjusted weighted least squares, a robust estimator appropriate for ordered categorical and binary observed variables.[39] All analyses took into account NESARC's complex design.

Complementary Analyses

To examine the robustness of our findings, we reproduced these analyses while using an alternative model of psychiatric disorder comorbidity and built upon the CFA model fit by Blanco et al,[21] which comprises 2 internalizing and 1 externalizing dimensions measured by 11 Axis I disorders and 7 personality disorders (Figure 2 and Supplementary Table 2).

RESULTS

Associations of Psychiatric Disorders With Suicide Attempt by Age Group

In the whole population of 34,653 individuals, the 3-year incidence rate of suicide attempt was 0.67% (SE = 0.05, n = 253). This rate was 1.0% (SE = 0.13, n = 77) for the 18–30 years age group, 0.96% (SE = 0.14, n = 73) for the 31–40 years age group, 0.81% (SE = 0.14, n = 63) for the 41–49 years age group, and 0.22% (SE = 0.05, n = 40) for the 50 years or older age group.

Among respondents who attempted suicide, 12-month prevalence rates of any Axis I or Axis II disorders were 75.0% (SE = 5.8) in the youngest age group, 60.4% (SE = 8.3) in those aged 31–40 years, 81.2% (SE = 5.4) in those aged 41–49 years, and 49.7% (SE = 9.8) in the oldest age group (Table 1). Apart from nicotine dependence, prevalence rates of psychiatric disorders ranged from 0.3% (pathological gambling) to 46.1% (major depressive episode) in the youngest age group, from 0.4% (pathological gambling) to 30.3% (major depressive episode) in those aged 31–40 years, from 2.0% (pathological gambling) to 39.2% (major depressive episode) in those aged 41–49 years, and from 0.0% (drug dependence and pathological gambling) to 22.2% (major depressive episode) in the oldest age group. In all 4 age groups, most psychiatric disorders were positively associated with the risk of suicide attempt (Table 2).

Structure of Current Mental Disorders Assessed at Wave 1

The multiple-group bifactor CFA model stratified by age groups provided an excellent fit to the data (CFI = 0.969, TLI = 0.963, RMSEA = 0.016) (Supplementary Table 1), as did the models in each age group (CFI ≥ 0.991, TLI ≥ 0.983, and RMSEA ≤ 0.012).

Effects of Psychiatric Disorders on the 3-Year Risk of Suicide Attempt

Following adjustments for sex, race/ethnicity, marital status, household income, and prior suicide attempt, the general psychopathology factor, representing the shared effect across all psychiatric disorders, increased the 3-year

risk of suicide attempt in all age groups. There was no additional effect of any other dimension of psychopathology or any specific disorder in any age group. In addition, prior suicide attempts and lower household income were significantly associated with increased risk of suicide attempt in participants aged 31–40 years, and being non-white increased this risk in those aged 41–49 years.

The standardized effect of the general psychopathology factor on suicide attempt risk ranged from 0.33 (SE = 0.06) in the oldest group to 0.59 (SE = 0.07) in those aged 41–49 years (all $P < .01$) (Figure 1). The magnitude of this effect was significantly greater among participants aged less than 50 years than among older participants (Wald $F = 5.52$, $P = .02$). R-squared values representing the percent of suicide attempt variance explained by the model ranged from 0.20 (oldest group) to 0.45 (41–49 years).

Complementary Analyses

The multiple-group bifactor of the 3-dimension CFA model also provided an excellent fit (CFI = 0.968, TLI = 0.966, RMSEA = 0.011) (Supplementary Table 2), as did the models in each age group (CFI ≥ 0.983, TLI ≥ 0.978, and RMSEA ≤ 0.010). The multiple group bifactor model yielded similar results, with the general psychopathology factor mediating most of the effects of the psychiatric disorders on suicide attempt risk (Figure 2). There was no direct effect from any other dimension or disorder. The magnitude of the effect of the general psychopathology factor was also significantly lower in participants aged 50 years and older than in younger participants (Wald $F = 5.74$, $P = .02$). R-squared values ranged from 0.19 (oldest group) to 0.44 (41–49 years).

DISCUSSION

In a large, nationally representative sample of US adults, several psychiatric disorders were strongly associated with suicide attempt risk during the 3-year follow-up across all age groups. We found that their effect on suicide attempt risk occurred through a general psychopathology dimension representing the shared effects across all psychiatric disorders in all age groups. The magnitude of the effect of the general psychopathology factor was significantly greater in the youngest age group than in the oldest group.

Our study extends previous findings[15] indicating that although many psychiatric disorders increase suicide attempt risk,[6,12,14,40–44] this risk is not specific to any single disorder in any age group, but rather is mediated by mechanisms shared by all disorders at all ages. This result helps summarize findings that both internalizing (eg, major depressive episode) and externalizing disorders (eg, substance use disorders), as well as comorbidity and severity of disorders, increase the risk of suicide attempt in all age groups.[6,12,14,15,40–43] These findings further underscore the importance of performing suicide risk assessments in individuals with any psychiatric disorder at all ages. They also suggest the potential value of interventions that can simultaneously target multiple psychiatric disorders[45,46] to reduce the risk of suicide attempt among individuals of all ages with psychiatric disorders.

Although the mechanisms underlying the association of the general psychopathology dimension and the risk of suicide attempt are unknown, several hypotheses can be advanced. There is evidence that genetic risk profiles,[47–49] brain circuitry,[50] and neurochemistry abnormalities[52] related to psychiatric disorders tend to overlap within the same liability dimension and across dimensions and are associated with increased suicide risk.[51,52] These biological abnormalities are shared to a large degree in older and younger adults.[53–55] For example, Demirkan et al[53] found similar genetic risk profiles for major depressive disorder and anxiety disorders in older and younger adults that were associated with increased risk for suicide attempt.[14] Certain personality traits[56,57] (such as emotional instability, hostility. and neuroticism), early-life stress,[58] and several adaptive defense mechanisms[59] (such as acting out and regression) tend to be stable across the lifespan and may contribute to this general predisposition toward mental illness and suicide attempt risk.[51,58]

The magnitude of the association between the general psychopathology factor and the 3-year risk of attempting suicide was stronger in younger than in older adults, as was the percent of suicide attempt variance explained by the model. Although this finding may be partly explained by selection related to premature mortality among individuals with psychiatric disorders[60–64] and cohort effects on certain environmental characteristics such as healthier lifestyles,[65] it may also be related to a greater protection against the effects of mental disorders in older adults. For example, more efficient down-regulation of negative affect in older than in younger individuals[66–69] may help to explain the weaker association between psychiatric disorders and the risk of suicide attempt among older adults.

Although older survivors of suicide attempts may differ in psychopathology from older adults who died by suicide, our results suggest that the greater suicide rates among older adults may not be due to increased psychopathological load, as measured by higher scores on the general psychopathology latent variable, but may be explained by other reasons. First, the older adults may be more medically frail and socially isolated, which may reduce their chance of rescue following a suicide attempt. Second, older adults may tend to more often use suicide methods with higher lethality rates[4] such as firearms, drowning, and hanging. Prior work suggests that violent suicide methods may be associated with insomnia,[70] a common condition among older adults. Third, certain risk factors for suicide may be more frequently observed among older adults. For example, voluntary emotion regulation is mostly under prefrontal cortex (PFC) control,[66] and a progression with aging of PFC white matter damages due to vascular diseases can impair emotion regulation and might increase the risk for suicidal behavior independently of psychopathology.[71] Older people also have a higher prevalence of general medical disorders that may increase the risk of suicide through independent mechanisms such as pain and

physical disability.[2,72] Lastly, decreasing social support and bereavement may contribute to suicide risk at least partially independently of psychopathology.[2,73] Our results highlight the need for systematically assessing and treating psychiatric disorders to reduce the risk of suicide as well as the value of complementary interventions targeting risk factors of suicide that may be at least partly independent of psychopathology, especially among older adults. Complementary programs focused on reducing social isolation by the use of telephone counseling, group activities, and psychotherapies focused on strengthening protective factors and resilience have shown efficacy on suicide risk reduction among older adults.[74]

Our study has several limitations. First, despite a prospective design, we cannot establish a causal relationship between psychiatric disorders and suicide attempt risk. Second, while the NESARC examined a wide range of psychiatric disorders in Wave 1, several disorders known to be linked to suicide attempts such as psychotic disorders and primary cognitive disorders were not assessed. Third, our model does not capture many social ecological dimensions of suicide risk reduction such as the protective role of increasing positive connectedness with family, peers, psychiatric health professionals, spirituality, and social institutions. Fourth, data on prior suicide attempt were assessed only for participants with a depressed mood at Wave 1. Lastly, information concerning suicide deaths was not available, limiting our analysis to nonfatal suicide attempts. Particularly, older survivors of suicide attempt may differ in psychopathology from older adults who died by suicide. Future studies are needed to examine whether our findings hold when examining suicide deaths among older and younger adults.

In all adult age groups, effects of psychiatric disorders on the risk of suicide attempt were almost exclusively mediated through a general psychopathology factor representing the shared effect across all disorders, and the magnitude of this effect was significantly greater in younger than in older adults. These results highlight the importance of performing suicide risk assessments in individuals of all ages with any psychiatric disorder. Our findings also underscore the need of continued research to determine biological and psychological mechanisms underlying this general psychopathology dimension. This knowledge might help reduce the considerable burden of suicide for all ages.

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Additional information: The original data set for the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) is available from the NIAAA (http://www.niaaa.nih.gov).

Supplementary material: Available at PSYCHIATRIST.COM.

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Editor's Note: We encourage authors to submit papers for consideration as a part of our Focus on Suicide section. Please contact Philippe Courtet, MD, PhD, at pcourtet@psychiatrist.com.

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Supplementary Material

Article Title: Effects of Psychiatric Disorders on Suicide Attempt: Similarities and Differences Between Older and Younger Adults in a National Cohort Study

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List of Supplementary Material for the article

1. **Table 1** Multiple-group (by age groups) bifactor model of the distress-fear-externalizing structure underlying past-year Axis I disorders and lifetime Axis II disorders in the full population in Wave 1 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

2. **Table 2** Multiple-group (by age groups) bifactor model of the internalizing I-internalizing II-externalizing structure underlying past-year Axis I disorders and lifetime Axis II disorders in the full population in Wave 1 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

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SUPPLEMENTARY MATERIAL

Supplementary Table 1. Multiple-group (by age groups) bifactor model of the distress-fear-externalizing structure underlying past-year Axis I disorders and lifetime Axis II disorders in the full population in Wave 1 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

CFI	**0.969**															
TLI	**0.963**															
RMSEA	**0.016**															
Age	**≤30 years**				**31–40 years**				**41-49 years**				**≥50 years**			
Mean age (SE)	24.1 (3.8)				35.7 (2.9)				44.9 (2.6)				64.2 (10.4)			
Disorder	GPF	Distress	Fear	EXT	GPF	Distress	Fear	EXT	GPF	Distress	Fear	EXT	GPF	Distress	Fear	EXT
MDE	0.59	0.49			0.65	0.52			0.62	0.64			0.74	0.48		
Dysthymia	0.58	0.62			0.59	0.62			0.56	0.75			0.61	0.52		
GAD	0.73	0.38			0.73	0.37			0.70	0.46			0.77	0.32		
Panic disorder	0.72		0.26		0.68		0.26		0.70		0.22		0.77		0.20	
Social anxiety	0.51		0.80		0.51		0.84		0.51		0.70		0.55		0.62	
Specific phobia	0.46		0.37		0.46		0.40		0.46		0.33		0.50		0.29	
Antisocial PD	0.42			0.39	0.44			0.41	0.47			0.44	0.53			0.49
Alcohol dependence	0.31			0.45	0.38			0.55	0.40			0.59	0.50			0.73
Drug dependence	0.58			0.60	0.65			0.66	0.66			0.68	0.73			0.75
Nicotine dependence	0.41			0.46	0.42			0.47	0.41			0.46	0.50			0.56

Factor covariance																
GPF	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
Distress	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00
Fear	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00
EXT	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00

Abbreviations: CFI, Comparative Fit Index; EXT, externalizing dimension; GAD, generalized anxiety disorder; GPF, general psychopathological factor; MDE, major depressive episode; OCPD, obsessive-compulsive personality disorder; PD, personality disorder; RMSEA, Root Mean Square Error of Approximation; SAD, social anxiety disorder; SE, standard error; TLI, Tucker-Lewis Index.

Supplementary Table 2. Multiple-group (by age groups) bifactor model of the internalizing I-internalizing II-externalizing structure underlying past-year Axis I disorders and lifetime Axis II disorders in the full population in Wave 1 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC).

CFI	**0.968**															
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Disorder	GPF	Distress	Other INT	EXT	GPF	Distress	Other INT	EXT	GPF	Distress	Other INT	EXT	GPF	Distress	Other INT	EXT
MDE	0.66	0.44			0.69	0.46			0.70	0.47			0.74	0.50		
Dysthymia	0.65	0.60			0.66	0.61			0.66	0.61			0.65	0.60		
GAD	0.74	0.32			0.74	0.32			0.73	0.31			0.75	0.32		
Panic disorder	0.66	0.14			0.64	0.14			0.65	0.14			0.70	0.15		
Social anxiety	0.66		0.27		0.68		0.28		0.64		0.27		0.67		0.28	
Specific phobia	0.51		0.14		0.52		0.14		0.50		0.14		0.52		0.14	
Mania/hypomania	0.63		-0.03		0.74		-0.03		0.76		-0.03		0.81		-0.03	
Avoidant PD	0.71		0.37		0.75		0.39		0.73		0.38		0.77		0.40	
Dependent PD	0.74		0.38		0.79		0.41		0.79		0.41		0.75		0.39	
OCPD	0.57		0.44		0.54		0.42		0.54		0.42		0.57		0.45	
Schizoid PD	0.61		0.42		0.62		0.43		0.62		0.44		0.63		0.44	
Paranoid PD	0.70		0.43		0.73		0.45		0.73		0.45		0.77		0.47	

Histrionic PD	0.57		0.31		0.62		0.34		0.65		0.36		0.67		0.36	
Antisocial PD	0.49			0.37	0.51			0.38	0.52			0.39	0.59			0.44
Alcohol dependence	0.32			0.44	0.39			0.53	0.42			0.56	0.52			0.70
Drug dependence	0.57			0.62	0.61			0.67	0.63			0.69	0.68			0.75
Nicotine dependence	0.40			0.49	0.41			0.50	0.40			0.48	0.47			0.58
Pathological gambling	0.40			0.26	0.44			0.29	0.41			0.26	0.44			0.28
Factor covariance																
GPF	1.00				1.00				1.00				1.00			
INT 1	0.00	1.00			0.00	1.00			0.00	1.00			0.00	1.00		
INT 2	0.00	0.00	1.00		0.00	0.00	1.00		0.00	0.00	1.00		0.00	0.00	1.00	
EXT	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00

Abbreviations: CFI, Comparative Fit Index; EXT, externalizing dimension; Other INT, other internalizing dimension; GAD, generalized anxiety disorder; GPF, general psychopathological factor; MDE, major depressive episode; OCPD, obsessive-compulsive personality disorder; PD, personality disorder; RMSEA, Root Mean Square Error of Approximation; SAD, social anxiety disorder; SE, standard error; TLI, Tucker-Lewis Index.