

# Introversion, Alexithymia, and Hostility: A Path Analysis From Personality to Suicidal Ideation Among University Students

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## Abstract

**Purpose:** The aim of the current study was to investigate the relationship between state (i.e., hostility) and trait (i.e., social detachment, alexithymia) psychological constructs associated with suicidal ideation among university students. **Methods:** A group of 190 university students was consecutively recruited in the period between September 2022 and March 2023. After a clinical interview, a series of psychological tests were administered: the Cattell's 16-Personality Factors Questionnaire (16PF), the Toronto Alexithymia Scale (TAS-20), the Symptom Checklist-90-R (SCL-90-R), and the amnestic form of the Cognitive Behavioral Assessment (CBA2.0), which contains a specific question regarding the suicidal ideation. **Results:** The analyses demonstrated

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Data Availability Statement included at the end of the article

that alexithymia fully mediated the relationship between a particular aspect of introversion (social detachment or low warmth) and hostility which, in turn, seemed to be a significant predictor of suicidal ideation. Conclusions: The path analysis conducted seemed to highlight the importance of personality traits, such as social detachment and the ability to recognize and express one's internal states, on the mental health of university students in terms of hostility and suicidal ideation. Considering that the reduction of suicide mortality has been prioritized as a global target in the 15-19 age group, identifying the psychological factors associated with it is fundamental.

### **Keywords**

Suicidal ideation, hostility, alexithymia, detachment, introversion, COVID-19

## **Introduction**

The COVID-19 pandemic has exacerbated experiences of mental distress (Bueno-Notivol et al., 2021; Lima et al., 2020; Rajkumar, 2020), and the prevalence of mental disorders, such as anxiety and depression (Baltà-Salvador et al., 2021; Cao et al., 2020; Husky et al., 2020; Lardone et al., 2021), eating disorders, alcohol/substance abuse (Browning et al., 2021; Charles et al., 2021; Gritsenko et al., 2021), is increasing over time even among students (Galvin et al., 2022). Some researchers proved that a significant increase in mental health problems in individuals is potentially linked to risk factors for suicide (Hawton et al., 2022). Recently, research highlighted that anger and hostility symptoms exacerbated by the COVID-19 pandemic (Panchal et al., 2021) can take on the characteristics of self-directed aggression, a potential driver of anti-conservative behavior (Berman et al., 2014; Gunn et al., 2011; Martin et al., 2020; Start et al., 2019). Even sub-clinical psychological stress-related symptoms, including anxiety, depression, anger, and hostility, could lead to suicidal ideation, especially among college students (Schepis et al., 2021). These data are even more alarming if we consider that the levels of distress have significantly increased in recent years (Cavalera, 2020). In general, the aggregate annual incidence rate of suicides in the first year of the pandemic was 4.9 cases/100,000, +10% compared to 2019. One in six young people had at least suicidal thoughts, and one in 33 attempted suicide (Bersia et al., 2022). In addition, suicide was the fourth leading cause of death among young people aged between 15 and 29 years old (World Health Organization, 2019). Globally, according to the latest World Health Organization (WHO) report (2019), 703,000 people die by suicide every year, which is the 20th cause of death around the world preceding malaria, breast cancer, wars, and murders. Consistent with the findings of the National Institute of Statistics, about 4,000 young people take their own lives every year in Italy.

A recent systematic review (Barberis et al., 2022a) described various social factors as influences for suicidal behaviors during the COVID-19 outbreak. Financial

insecurity, such as loss of employment and fear of losing housing, could have contributed to increased levels of suicidal behaviors (Ettman et al., 2020) as well as having contracted the virus, with most cases occurring within the first week (Sripad et al., 2021), and shame and frustration deriving from testing positive (Kar et al., 2021). Psychiatric vulnerability (also exacerbated by restricted access to healthcare services (Que et al., 2020)), including severe mood disorders, anxious symptomatology, obsessive-compulsive disorder, eating disorders, and alcohol overuse (Fountoulakis et al., 2021) was also associated with anti-conservative behaviors. Furthermore, trauma and burnout symptomatology might have played intervening roles (Mortier et al., 2021; Tasnim et al., 2020). Nevertheless, the social distancing measures and isolation implemented to prevent the spread of the virus could have led to a lack of social connections, thereby, increasing suicidal ideation and thoughts of self-harm (Elbogen et al., 2021). Additionally, relational difficulties, such as maltreatment and violence (Knowles et al., 2022), detachment from social relationships, as well as lack of relevant social bonds (Crasta et al., 2020; Gratz et al., 2020), and strained relationships (Evans et al., 2020; Han et al., 2021), were found to be relevant risk factors.

Even specifically considering the category of university students, suicide rates have increased (Nomura et al., 2021) and suicidal ideation has doubled in 2020 along with depression when compared to 2019 and 2016 (Brailovskaia et al., 2021). The influential factors include past suicidal thoughts and attempts, mood disorders, and stress (Tasnim et al., 2020 in Barberis et al., 2022a, 2022b) as well as online learning problems and academic stress (Manzar et al., 2021; Peng et al., 2023).

In light of these assumptions, suicide is becoming a serious global public health issue. The exacerbation of this mental attitude is well-known as a construct of “hopelessness” (Beck et al., 1974) or “psychache” (Lambert et al., 2020). People who suffer from depression and hopelessness may think that this factor can be alleviated only by resorting to suicide (Chin & Holden, 2013; Troister et al., 2013, 2015). However, the precipitating factors that immediately precede depression and hopelessness remain largely unpredictable and extremely subjective (Cole et al., 2019). Nevertheless, researchers agree that even suicidal ideation can be associated with specific personality traits, such as introversion, social detachment, and alexithymia (Hawton et al., 2022; Huang et al., 2017) as well as various psychiatric disorders (Tukaiev et al., 2020).

Alexithymia is a construct generally associated with clinically relevant mental health outcomes (Quinto et al., 2022). For instance, difficulty identifying emotions (i.e., an aspect of alexithymia) indirectly affected mental health through the amplification of mental distress experienced by university students (Dalbudak et al., 2013; Hamaideh, 2018). The alexithymia construct was formulated within a theoretical framework for the cognitive processing and regulation of emotions which explained different clinical perspectives (Taylor & Bagby, 2013). According to the predisposition hypothesis, primary alexithymia is defined as a stable personality trait and it is hypothesized to be causally related to psychological disorders due to impaired emotional processing (De Vente et al., 2006). On the contrary, according to

the reactivity hypothesis, alexithymia may be secondary to events, representing a state reaction (Freyberger, 1977; Wise et al., 1990). Alexithymia may compromise the ability to regulate and manage negative emotions resulting from the stressful events of the chronic disease and its sequelae (Quinto et al., 2022). Nevertheless, the development of alexithymic traits has been observed from several theoretical perspectives, including attachment theory (Barberis et al., 2023), psychoanalysis, (Taylor & Bagby, 2013), and self-determination theory (Barberis et al., 2022b). More specifically, a recent line of studies highlighted that alexithymia is strictly linked to individual traits, including interpersonal dimensions. For instance, alexithymia significantly mediated the relation between attachment and psychopathology (Barberis et al., 2023) and it was influenced by maternal support and maternal and paternal supportive parenting through need satisfaction and need frustration, respectively, in young adults (Barberis et al., 2022b).

According to the aforementioned studies, alexithymia may amplify the already existing relationship between personality traits and mental distress, such as the relationship between introversion (particularly, a specific facet that is social detachment or low warmth) and hostility (Guidotti et al., 2022) yet described among university students, resulting in a strong relation between alexithymia and high levels of hostility (Ifrah Naaz et al., 2022; Sfeir et al., 2020; Tukaiev et al., 2020; Vanheule et al., 2011; Zhyvotovska et al., 2020) as well as suicidal ideation (Hawton et al., 2022; Huang et al., 2017). Therefore, negative emotionality as a consequence of the mediating role exerted by the alexithymic traits may be one of the key mechanisms explaining suicidal ideation among university students.

Because the reduction of suicide mortality has been prioritized (WHO, 2019) as a global target, it is essential to identify which risk factors or clinical conditions can lead to suicidal ideation and, consequently, to possible suicide attempts. Although thoughts of death do not always turn into suicide, it is necessary to investigate them, as they can represent precursors (Berman et al., 2014; Berman & Schwartz, 1990). Therefore, the present study aimed to investigate: (1) the rate of suicidal ideation of a group of Italian university students; (2) whether alexithymia could be significant as a mediating variable between introversion (social detachment or low warmth) and hostility; and (3) whether suicidal ideation could be predicted by hostility.

## Materials and Methods

### *Participants and Procedure*

In this exploratory and cross-sectional study, 190 students (108 females and 83 males), between 19 and 39 years old were examined. All of the participants consecutively went to the Laboratories of Clinical Psychology, Clinical Psychophysiology, and Clinical Neurophysiology of the Department of Medicine and Surgery of the University of Parma in the period between September 2022 and March

2023, responding to some posters, which offered a link to book an appointment in the Labs via the Outlook calendar. For this reason, the sample is made up of students of various majors (medicine, psychology, educational sciences, communication, law, economics, nursing, biology, information, etc.). The researchers explained the purpose of the study and the instruments that would be administered to students, without specifying the single scales, so as not to nullify their face validity. Once the tests were administered, participants were offered the option to book another appointment with a licensed clinical psychologist to possibly receive an exhaustive commentary and ask questions. Criteria for inclusion in the study were age >18 years old, completion of informed consent, and no history of psychiatric and/or neurological syndromes (e.g., previous head trauma, epilepsy, etc.) and/or physical diseases (i.e., sensory disturbances of sight and/or hearing) that may limit the administration of the tests.

## Measures

*The Following Instruments Were Administered.* The *Cattell's 16 Personality Factors Questionnaire* (16PF; Cattell, 1945, 1946, 1989; Cattell & Krug, 1986; Sirigatti & Stefanile, 2001) is composed of 105 items, with three possible different responses (True/False/Uncertain), that identify 16 primary, bipolar, and relatively independent personality factors. The 16 dimensions identified are A = Warmth (6 items); B = Reasoning (8 items); C = Emotional stability (6 items); E = Dominance (6 items); F = Liveliness (6 items); G = Rule-Consciousness (6 items); H = Social Boldness (6 items); I = Sensitivity (6 items); L = Vigilance (6 items); M = Abstractness (6 items); N = Privateness (6 items); O = Apprehension (6 items); Q1 = Openness to change (6 items); Q2 = Self-Reliance (6 items); Q3 = Perfectionism (6 items); Q4 = Tension (6 items). Additionally, the Image Management scale (IM scale; 7 items) identifies the tendency of the participants to provide a socially desirable self-image. A key feature of the 16PF questionnaire is that it asks respondents about specific situations, rather than requiring self-assessment of their personality traits. For instance, the items are formulated as follows: "I enjoy being part of a group" and "I enjoy discussing movies and books with others". Raw scores are converted into a nine-point scale, ranging from 1 to 9. Scores between 4 and 7 are considered average. The mean value of Cronbach's alpha for the various scales is equal to 0.71 (ranging from 0.66 to 0.93 across the 16 personality factors).

The *Toronto Alexithymia Scale* (TAS-20; Bressi et al., 1996) is a self-assessment questionnaire based on a 5-point Likert scale that measures the construct of alexithymia. This tool is composed of 20 items, with scores divided into three factorial scales that reflect the three dimensions of alexithymia: Difficulty Identifying Feelings (DIF; 7 items, e.g., "I am often confused about the emotions I feel."), which investigates the difficulty in identifying feelings and distinguishing between feelings and physical sensations; Difficulty Describing Feelings (DDF; 5 items, e.g., "I'm having a hard time finding the right words to express my

feelings.”), which measures the difficulty in describing one’s feelings to others; and Externally-Oriented Thinking (EOT; 8 items, e.g., “I’d rather let things take their course than understand why they happened the way they did.”), which evaluates the presence of a cognitive style oriented towards external reality. Each item is rated on a five-point Likert scale: “Strongly Disagree” (1), “Disagree” (2), “Neither Agree Nor Disagree” (3), to “Agree” (4), and “Strongly Agree” (5). The TAS-20 total score ranges from 20 to 100. According to the scoring system, a total score equal to or greater than 61 indicates alexithymia, a score ranging from 52 to 60 suggests borderline alexithymia and a score equal to or less than 51 indicates the absence of alexithymia. This tool demonstrated good internal consistency (Cronbach’s  $\alpha = 0.81$ ).

Psychopathological symptoms were assessed through the *Symptom Checklist-90-Revised* (SCL-90-R; Derogatis, 1994; Prunas et al., 2012). The SCL-90-R is a self-report instrument measuring the presence and extent of internalizing and externalizing psychopathological symptoms experienced by the participant in the week preceding the compilation. It includes 90 items referred to the following different clinical scales: Somatization (SOM; 12 items, e.g., “Headache”), Obsessive and Compulsive (O-C; 10 items, e.g., “Having to do things very slowly to make sure you do them well”), Interpersonal sensitivity (I-S; 9 items, e.g., “Tendency to criticize others”), Depression (DEP; 13 items, e.g., “Loss of sexual interest or pleasure”), Anxiety (ANX; 10 items, e.g., “Nervousness or internal agitation”), Hostility (HOS; 6 items, e.g., “Feeling easily annoyed or irritated”), Phobic anxiety (PHOB; 7 items, e.g., “Afraid of going out alone”), Paranoid ideation (PAR; 6 items, e.g., “Belief that others are responsible for most of your disease”), and Psychoticism (PSY; 10 items, e.g., “Belief that someone else can control your thoughts”) (cut-off = 0.75). The items are rated on a five-point Likert scale of distress in the previous week: “Not At All” (0), “A Little Bit” (1), “Moderately” (2), to “Quite A Lot” (3), and “Extremely Often” (4). The raw score is obtained from the total score of each scale divided by the number of its items: 0.75 represents the cut-off to consider the clinical relevance of each dimension. The corresponding Cronbach’s  $\alpha$  value for a general scale including all of the items was 0.96.

Personal data and anamnestic information were extrapolated from Sheet 4 of the Cognitive Behavioral Assessment (CBA2.0; Bertolotti et al., 1990). In particular, the following information was extrapolated: (1) previous psychological consultation; (2) previous psychiatric hospitalizations; (3) self-reported severity of one’s mental problems; (4) prior psychotherapy; and (5) interest in pursuing a psychological treatment. Moreover, our outcome of interest was suicide ideation, based on the question, “During the past 12 months, have you ever seriously thought about committing suicide?” The response was dichotomous and coded as 0 (“No”) and 1 (“Yes”).

## Statistical Analysis

All statistical analyses were performed using SPSS (Version 28.0.1.0; IBM Corp, Armonk, NY, USA). Descriptive statistics of the SCL-90-R, TAS, and 16PF scores of the sample were performed with the calculation of the mean (M) and standard deviation (SD). A Pearson's correlation analysis was conducted to examine the association between the psychological dimensions of interest (i.e., social detachment, alexithymia, hostility, and suicidal ideation as well as gender and age). Tests for Skewness, Kurtosis, and Kolmogorov-Smirnov were used to determine the normality of distribution. Furthermore, in a multicollinearity test, no extreme coefficient values  $\geq 0.8$  were found among the independent variables, indicating a low risk of multicollinearity. All independent variables had variance inflation factors  $\leq 10$  and tolerance  $\geq 0.1$ , indicating the absence of multicollinearity. All the assumptions for the conduction of parametric statistics had been met.

We also conducted a Path Analysis to assess the association between personality (16PF factor A or Warmth), alexithymia (TAS Total Score), hostility (SCL-90-R HOS), and Suicidal Ideation (CBA2.0 Suicidal Ideation) using a Maximum Likelihood (ML) estimator. The goodness of fit of the model was evaluated using the Chi-square statistic ( $\chi^2$ ), the Comparative Fit Indices (CFI), the Tucker-Lewis index (TLI), and the Root Mean Square Error of Approximation (RMSEA). Nonsignificant  $\chi^2$ , CFI, and TLI values of 0.95, and RMSEA values of 0.06 were considered measures of good fit (Hu & Bentler, 1999). Statistical significance was set to  $p < .05$ . To test the research hypotheses, a serial mediation analysis using the PROCESS macro for SPSS v22 (Hayes, 2017) was implemented. Warmth (16PF factor A) was the independent variable, the Alexithymia (TAS Total score) was the serial mediator, and Hostility (SCL-90-R HOS) was the dependent variable. In addition, a logistic regression analysis was performed considering Hostility (SCL-90-R HOS) as the independent variable and Suicidal Ideation (CBA2.0 Suicidal Ideation) as the dependent variable.

## Results

### *Descriptive Statistics of the Sample*

The sample was composed of 82 (35.6%) men and 108 (64.4%) women. The mean age was 25.21 (SD = 5.39). Most of the participants were university students (89.7%) and only 19 (10.3%) were also employed. Academic year distribution among students was year 1 (31.8%), year 2 (46.4%), year 3 (3%), year 4 (10.6%), and year 5 (8.2%). The sample was made up of students of various majors (i.e., Medicine and Surgery (12.1%), Psychology (10.6%), Health professionals as nursing and physiotherapy (25.7%), Humanistic, social, and cultural enterprise disciplines (4.5%), Chemical, biological, biotechnological, and pharmaceutical sciences (10.6%), Sport Science (24.2%), and Mathematics and engineering (12.3%)).



Considering the SCL-90-R questionnaire, the obtained results showed high scores related to mood alteration and obsessive-compulsive manifestations. In addition, anxious activation characterized our sample as well as paranoid ideation. Somatic complaints and sensitivity in interpersonal relationships were reported at the limits of the clinical cut-off. Regarding personality traits, emotional stability (C), self-control (Q3), self-reliance (Q2), privateness (N), and warmth (A) factors reported lower values whereas the tension (Q4) factor was higher. Instead, the alexithymia scale shows a score that approaches only the pre-clinical threshold. The descriptive statistics of the sample's psychometric tests are shown in [Table 1](#).

Looking at the anamnestic information, it emerged that only 16.76% of the students had undergone psychological treatment in the past and only 12.43% of them had undergone psychotherapy. Only one person reported a history of psychiatric hospitalization. Taking into account the self-reported severity, 28.2%, 16.7%, and 2.6% of the sample considered their problems to be mild, moderate, and serious, respectively. Furthermore, only 9 people (13.4%) were already under the care of a mental health specialist among the 81.7% of students willing to undergo psychological treatment. Lastly, 15.1% affirmative answers were found to the question investigating suicidal ideation.

### *Correlations Between Variables of Interest*

Pearson's correlation showed that all of the variables of interest were significantly associated with each other. The 16PF personality factor A (Warmth) correlated negatively with the global score of the TAS scale, which, correlated positively with the clinical scale of the SCL-90-R that investigated the presence of hostility. A significant association was recorded also between factor A (Warmth) and hostility. Looking at suicidal ideation, it negatively correlated with factor A and positively with hostility and suicidal ideation. Lastly, gender was associated with TAS score. Pearson's coefficients are shown in [Table 2](#).

### *The Path Model*

The path model is presented in [Figure 1](#). We tested a model in which factor A was hypothesized to be a significant predictor of hostility indirectly through the involvement of alexithymia. Then, Hostility was considered a predictor of Suicidal Ideation.

Warmth (16PF factor A) significantly predicted both hostility (SCL-90-R HOS) [ $B = -0.31$ ;  $SE = 0.12$ ;  $p < .05$ ; LLCI-ULCI ( $-0.55, -0.06$ )] and alexithymia (TAS Total score) [ $B = -1.54$ ;  $SE = 0.45$ ;  $p < .001$ ; LLCI-ULCI ( $-2.43, -0.65$ )] which, in turn, predicted hostility (SCL-90-R HOS) [ $B = 0.03$ ;  $SE = 0.01$ ;  $p < .001$ ; LLCI-ULCI ( $0.02, 0.03$ )]. However, the mediation analysis showed that alexithymia (TAS Total score) fully mediated the relationship between warmth (16PF factor A) and hostility (SCL-90-R HOS) as low warmth (16PF factor A) increased hostility (SCL-90-R HOS)



**Table 1.** Descriptive Statistic of the Psychometric Tests (n = 190).

|  |                |
|--|----------------|
| Symptom checklist-90-revised, <i>M</i> ± <i>SD</i>                         |                |
| Somatization   | 0.76 ± 0.65    |
| Obsessive and compulsive   | 1.21 ± 0.98    |
| Interpersonal sensitivity  | 0.74 ± 0.65    |
| Depression   | 1.1 ± 0.98     |
| Anxiety  | 0.80 ± 0.79    |
| Hostility  | 0.54 ± 0.38    |
| Phobic anxiety   | 0.35 ± 0.6     |
| Paranoid ideation  | 0.85 ± 0.65    |
| Psychoticism   | 0.51 ± 0.63    |
| Toronto Alexithymia scale, <i>M</i> ± <i>SD</i>                            |                |
| Total score  | 48.36 ± 12.53  |
| Personality factors questionnaire, <i>M</i> ± <i>SD</i> ( <i>Stanine</i> ) |                |
| Warmth (A)   | 5.89 ± 2.7 (3) |
| Reasoning (B)  | 5.04 ± 1.4 (6) |
| Emotional stability (C)  | 6.63 ± 2.5 (3) |
| Dominance (E)  | 5.62 ± 1.9 (5) |
| Liveliness (F)   | 7.1 ± 2.6 (5)  |
| Rule-consciousness (G)   | 7.15 ± 2 (4)   |
| Social boldness (H)  | 5.99 ± 2.4 (4) |
| Sensitivity (I)  | 6.3 ± 2.1 (6)  |
| Vigilance (L)  | 7.34 ± 2.3 (6) |
| Abstractness (M)   | 7.54 ± 1.9 (6) |
| Privateness (N)  | 6.33 ± 2 (3)   |
| Apprehension (O)   | 6.05 ± 2.1 (6) |
| Openness to change (Q1)  | 6.21 ± 2 (4)   |
| Self-reliance (Q2)   | 6.29 ± 2 (2)   |
| Perfectionism (Q3)   | 7.02 ± 2.3 (3) |
| Tension (Q4)   | 6.22 ± 2.5 (8) |

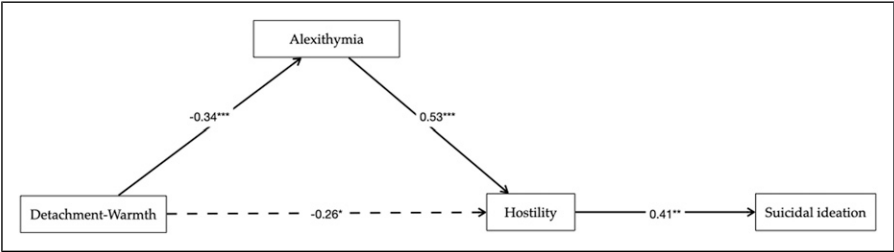
only indirectly when including alexithymia (TAS Total score) [Sobel test =  $-2.26$ ,  $SE = 0.02$ ;  $p < .05$ ] and not at all when excluding hostility.

Moreover, a logistic regression was performed to ascertain the effects of hostility on the likelihood that participants have suicidal ideation. The logistic regression model was statistically significant, [ $\chi^2(12) = 29.37$ ,  $p < .01$ ]. The model explained 39.8% (Nagelkerke  $R^2$ ) of the variance in suicidal ideation and correctly classified 71.0% of cases. Increasing hostility (SCL-90-R HOS) was associated with a likelihood of producing thoughts of death (CBA2.0 Suicidal Ideation). Lastly, the path model showed good indices of fit:  $\chi^2$  ( $p = n.s.$ ), CFI (0.95), TLI (0.95), and RMSEA (0.06).

**Table 2.** Relationship Between Variables.

|                            | 1       | 2      | 3     | 4    | 5    |
|----------------------------|---------|--------|-------|------|------|
| 1 16-PF warmth             |         |        |       |      |      |
| 2 TAS total                | −0.34** |        |       |      |      |
| 3 SCL-90-R hostility       | −0.26*  | 0.56** |       |      |      |
| 4 CBA2.0 suicidal ideation | −0.35** | 0.27*  | 0.26* |      |      |
| 5 Gender                   | n.s.    | 0.24*  | n.s.  | n.s. |      |
| 6 age                      | n.s.    | n.s.   | n.s.  | n.s. | n.s. |

Legend: \* =  $p < .05$ ; \*\* =  $p < .01$ ; 16-PF = Cattell's 16-Personality Factors Questionnaire; CBA2.0 = Cognitive-Behavioural Assessment 2.0; SCL-90-R = Symptom Checklist-90-Revised; TAS = Toronto Alexithymia Scale.  
Note. Gender was coded as 0 = male and 1 = female and Suicidal Ideation was coded as 0 = no and 1 = yes.



**Figure 1.** Alexithymia fully mediated the relationship between low Warmth and Hostility ( $\beta$ ,  $p$ ), which, in turn, predicted Suicidal Ideation (Exp(B),  $p$ ). Legend: \* =  $p < .05$ , \*\* =  $p < .01$ , \*\*\* =  $p < .001$ .

**Discussion**

One of the principal aims that drove our research was to describe the level of mental health among university students. In particular, some objective measures were used along with qualitative data reported in Sheet 4 of the CBA2.0 by the participants to assess specific personality traits associated with hostility and suicidal ideation. Obtained data confirmed previous studies on the high incidence of psychological symptoms of distress among university students, already documented in all of the phases of the COVID-19 pandemic (Baltà-Salvador et al., 2021; Bueno-Notivol et al., 2021; Cao et al., 2020; Galvin et al., 2022; Husky et al., 2020; Lardone et al., 2021). It was possible to note the presence of relevant clinical symptoms in the clinical scales of the SCL-90-R. In the face of a slight anxious activation accompanied by somatic complaints, a modest deflection of mood and obsessive-compulsive traits emerged. Additionally, other clinical scales of the SCL-90-R exceeded the clinical cut-off. For example, the paranoia score highlighted a nuanced tendency towards suspiciousness and paranoid ideation that deserves to be explored. Looking at the data collected

through the anamnestic form, the students involved in our research reported the same suffering described above also at the subjective level. In particular, about 1 in 3 students, 1 in 6 students, and 1 in 40 students acknowledged that their problems were mild, moderate, and serious, respectively. Furthermore, 81.7% of students would be interested in psychological treatment, but only 13.4% of them already turned to a mental health specialist. Lastly, the suicidal ideation rate seemed to be consistent with recent literature (Xu et al., 2021), but it was still alarming (15.1% of people answered “Yes” to the question “Have you ever seriously thought about committing suicide during the past 12 months?”). Although investigating suicidal ideation through an open-ended question with a dichotomous response may have generated false positives (Walker et al., 2011; Wu et al., 2020), our findings are consistent with other studies (Meng et al., 2013; Xu et al., 2021). The percentage of students with suicidal thoughts at 15.1% was consistent with previous research that found suicidal thoughts ranging from 15.1% to 16.2% (Granieri et al., 2022; Gulec Oyekcin et al., 2017; Poorolajal et al., 2017).

Furthermore, the importance of the analysis of stable traits involved in the manifestation of distress was also confirmed (Baiano et al., 2020; Biondi et al., 2021; Meda et al., 2021; Nicolai et al., 2016; Zhu et al., 2016). Particularly, the personality test described a group of tense and energetic students with poor emotional and impulse management skills, who tended to be dependent and sensitive to the judgment and approval of others as well as reserved and isolated. The objective of our research precisely investigate this last trait, namely factor A of Cattell’s 16PF questionnaire. Following the authors (Cattell, 1946; Sirigatti & Stefanile, 2001), this temperamental characteristic is a facet of introversion that focuses on people’s ability to open up to others and share their internal and emotional experiences. The same authors believe it overlaps with the construct of social detachment (Tukaiev et al., 2020; Vanheule et al., 2011). In our previous work (Guidotti et al., 2022) we found this aspect to be significantly associated with hostility. In the current research, these findings were confirmed both directly within a regression analysis and indirectly via alexithymia, which fully mediated the relationship between the trait (i.e., social detachment or low warmth) and state (hostility) variables once included in the statistical model. The results of the study seem to suggest that alexithymia had the function of relating individual trait characteristics (introversion/detachment) with the manifestation of hostility. Nevertheless, our findings underline the importance of the identification and recognition of emotions could have played a crucial role in students’ mental health analyzed in the post-COVID-19 period. The effects of isolation and poor emotional sharing are probably emerging in this way and only now. However, at a general level, the role of introversion as a significant predictor of alexithymia was already described some time ago (Beales & Dolton, 2000; Wise et al., 1992).

Regarding the possible and significant role of alexithymia in increasing psychopathological symptoms, it is not the first time that it has been associated with an increasing factor in the distress experienced by university students (Dalbudak et al., 2013; Hamaideh, 2018). Although our data only came close to the borderline parameters, other researchers even reported a high level of alexithymia per se (Alzahrani

et al., 2020). Considering hostility in particular, previous studies already found irritable mood to be significantly associated with alexithymia (Ifrah Naaz et al., 2022; Sfeir et al., 2020; Tukaiev et al., 2020; Vanheule et al., 2011; Zhyvotovska et al., 2020).

However, to our knowledge, this is the first time the association between state and trait psychological dimensions associated with suicidal ideation among university students was specifically assessed within a comprehensive path analysis. The statistical analysis confirmed the existing association between the psychological variables investigated as it was observed that alexithymia fully mediated the relationship between low levels of warmth (and, conversely, high levels of social detachment) and increased hostility levels. Consequently, it was evaluated whether hostility could predict suicidal ideation among our group of students. The logistic regression performed was found to be significant. The path model that we have conducted highlighted that hostility, in a withdrawn and socially detached person with a poor ability to “read” and “share” one’s emotional states, could have very dangerous effects on health because it is associated with thoughts of death.

Although our study has allowed the description of a “segment” of psychological variables that can favor the production of thoughts of death, the findings need to be read in light of the limitations. First, the cross-sectional nature of the study cannot confirm the causality of relationships between observed variables. In addition, the ad hoc sampling may not be representative of the population of university students because participants in the study might have been driven by curiosity or motivation to learn more about certain aspects of themselves. It can also be assumed that these people stated their mental suffering to implicitly request help. Furthermore, the small sample size and the imbalance in favor of female students is a limitation that future studies should overcome. Another possible limitation concerns the lack of standardized instruments for assessing suicidal ideation. Some previous studies noted that dichotomous responses to explicit questions about suicidal ideation might not accurately reflect suicidality. Questions designed specifically to assess suicidal thoughts with face validity may be more appropriate. Therefore, there may be a higher rate of false positives (Walker et al., 2011; Wu et al., 2020; Xu et al., 2021). Furthermore, now that the relationship between personality, alexithymia, and hostility has been established, future studies could include more accurate measurements of the various facets of anger. For example, STAXI-2 is a good tool for identifying trait and state characteristics of anger, as well as anger control and expression. These measurements could be associated with more objective ones (i.e., psychophysiological evaluation) to highlight the effective psychophysical impact of the complained psychological distress. Lastly, although the analysis of levels of depression and obsessive-compulsive traits was not one of the objectives of this study, it would be advisable for future research to consider these aspects. Future studies should involve additional psychopathological symptoms and test the same model in different sub-groups (i.e., students without altered mood) and, generally, in a larger sample.

Despite these limitations, the possible clinical implications could be considerable. Highlighting the need to assess specific individual traits among university students could help identify those most at risk of anti-conservative behavior. Furthermore, a fundamental role emerged to be that of hostility as well as alexithymia. In the first case, the management of emotions and how hostility is expressed can be fundamental in the

production of thoughts of death which could lead to a self-directedness of anger. On the other hand, it also emerged that knowing how to recognize and communicate one's internal states is a factor that might be capable of mediating personality traits with negative emotionality. These findings highlight how alexithymia is currently a poorly understood condition that deserves to receive more attention from researchers.

Nevertheless, other interesting trait characteristics also emerged in our sample. Low scores on the N factor of the 16PF are typical of people who want to be known by others and who wish to be open, frank, and genuine in social situations, and reveal themselves with a defenseless attitude. Although this aspect may partially contradict the low warmth scales, it also highlights the willingness to self-open despite the difficulties in recognizing and verbally sharing one's internal states. On top of this fact, another personality trait could be a promising clinical indicator of the effectiveness of psychological interventions (Sirigatti & Stefanile, 2001). The tension (Q4) factor generally increases when anxious activation is not followed by an adequate channeling of psychophysical energies. Conversely, clinical psychologists can functionally guide this motivational drive for change, facilitating emotional expression in these people. Despite these considerations, there are still no Clinical Psychology and Psychotherapy Services within Universities promoting psychological adaptation to the challenges that students have to face daily, including the consequences of the COVID-19 pandemic, as well as the growth of better stress management and emotional self-regulation skills.

## Conclusions

To summarize, our findings provide evidence that the way emotions are identified and expressed influences psychological distress (i.e., hostility) and death thoughts. Our results highlighted that our sample is really at risk because low values of warmth have been described as well as a high rate of suicidal ideation, albeit consistent with statistics provided by other researchers at other universities. The intervening factors that seem to modulate the path from one to the other were described. However, it is necessary to intervene in the distress experienced by these people and on their ability to manage it. The results shed light on the need to propose psychological interventions aimed at university students who need to train their emotional self-regulation skills and learn to share their experiences by taking advantage of social support. Although this study is not the first one to show alarming levels of psychopathological symptoms in college students, adequate counseling and psychotherapy services for this type of discomfort and for the number of suffering people do not exist. As evidenced by our findings, a large number of students would be willing to undertake a psychological intervention, but only a few of them do it. Clinical psychological research needs to intercept the implicit "request for help". Some people experience mental suffering but do not turn to mental health professionals, probably because of the social stigma that still labels them. To conclude, identifying these conditions might favor the identification of predisposing factors that anticipate suicidal ideation and help clinicians in suicidal risk detection. A multidimensional assessment can represent a valid contribution to developing a tailored

approach to the risk management of each person, especially in light of the consequences provoked by the pandemic mental health emergency.

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### **Ethical Statement**

#### *Ethical Approval*

The research was conducted in compliance with the guidelines for good scientific practice outlined by the University of Parma. All procedures were conducted following the Declaration of Helsinki and its later advancements.

#### *Informed Consent*

All data were handled in accordance with the ethical standards established in the 1964 Helsinki Declaration. Subjects' anonymity was preserved, and the data obtained were used solely for scientific purposes. All patient/personal identifiers have been removed or disguised so the patient/person(s) described are not identifiable and cannot be identified through the details of the story.

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### **Data Availability Statement**

The data presented in this study are available upon reasonable request from the corresponding author.

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