Maternal personality profile of children affected by migraine

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Background: Empirical evidence of the important role of the family in primary pediatric headache has grown significantly in the last few years, although the interconnections between the dysfunctional process and the family interaction are still unclear. Even though the role of parenting in childhood migraine is well known, no studies about the personality of parents of migraine children have been conducted. The aim of the present study was to assess, using an objective measure, the personality profile of mothers of children affected by migraine without aura (MoA).

Materials and methods: A total of 269 mothers of MoA children (153 male, 116 female, aged between 6 and 12 years; mean 8.93 ± 3.57 years) were compared with the findings obtained from a sample of mothers of 587 healthy children (316 male, 271 female, mean age 8.74 ± 3.57 years) randomly selected from schools in the Campania, Umbria, Calabria, and Sicily regions. Each mother filled out the Minnesota Multiphasic Personality Inventory–second edition (MMPI-2), widely used to diagnose personality and psychological disorders. The  t-test was used to compare age and MMPI-2 clinical basic and content scales between mothers of MoA and typical developing children, and Pearson’s correlation test was used to evaluate the relation between MMPI-2 scores of mothers of MoA children and frequency, intensity, and duration of migraine attacks of their children.

Results: Mothers of MoA children showed significantly higher scores in the paranoia and social introversion clinical basic subscales, and in the anxiety, obsessiveness, depression, health concerns, bizarre mentation, cynicism, type A, low self-esteem, work interference, and negative treatment indicator clinical content subscales (P < 0.001 for all variables). Moreover, Pearson’s correlation analysis showed a significant relationship between MoA frequency of children and anxiety (r = 0.4903, P = 0.024) and low self-esteem (r = 0.5130, P = 0.017), while the MoA duration of children was related with hypochondriasis (r = 0.6155, P = 0.003), hysteria (r = 0.6235, P = 0.003), paranoia (r = 0.5102, P = 0.018), psychasthenia (r = 0.4806, P = 0.027), schizophrenia (r = 0.4350, P = 0.049), anxiety (r = 0.4332, P = 0.050), and health concerns (r = 0.7039, P < 0.001) MMPI-2 scores of their mothers.

Conclusion: This could be considered a preliminary study that indicates the potential value of maternal personality assessment for better comprehension and clinical management of children affected by migraine, though further studies on the other primary headaches are necessary.

Keywords: MMPI-2, childhood migraine, maternal personality

Introduction
Migraine without aura (MoA) may be considered the most frequent primary headache in childhood.1 Children affected by migraine have been consistently shown to have more recurrent illnesses2 and school absences, decreased academic performance, social stigma, and impaired ability to establish and maintain peer relationships.3,4 In
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The MMPI-2 is widely used to diagnose personality and psychological disorders. It consists of 567 items, all true-or-false format, and usually takes between 1 and 2 hours to be completed. In order to verify the mean differences between the two groups of mothers, we took into account only the two main scales: the clinical basic scale and content scale.

The clinical basic scale is used to evidence different psychotic conditions, and is composed of ten items: hypochondriasis (Hs; to assess a neurotic concern over bodily functioning), depression (D; originally designed to identify depression, characterized by poor morale, lack of hope in the future, and a general dissatisfaction with one’s own life situation), hysteria (Hy; designed to identify the “hysterical” response in stressful situations), psychopathic deviate (Pd; originally developed to identify psychopathic patients, this scale measures social deviation, lack of acceptance of authority, and amorality, and can be considered also as a measure of disobedience), masculinity/femininity (Mf-f; this scale was designed by the original authors to identify homosexual tendencies, but was found to be largely ineffective; high scores on this scale are related to factors such as intelligence, socioeconomic status, and education; women tend to score low on this scale), paranoia (Pa; originally developed to identify patients with paranoid symptoms, such as suspiciousness, feelings of persecution, grandiose self-concepts, excessive sensitivity, and rigid attitudes), psychasthenia (Pt; this scale could be considered more reflective of obsessive–compulsive disorder), schizophrenia (Sc; this scale was originally developed to identify schizophrenic patients and reflects a wide variety of areas, including bizarre thought processes and peculiar perceptions, social alienation, poor familial relationships, difficulties in concentration and impulse control, lack of deep interests, disturbing questions of self-worth and self-identity, and sexual difficulties), hypomania (Ma; this scale was developed to identify such characteristics of hypomania as elevated mood, accelerated speech and motor activity, irritability, flight of ideas, and brief periods of depression), social introversion (Si; this scale is designed to assess the tendency to withdraw from social contacts and responsibilities).

The content scale is composed of 15 items: anxiety (ANX), fears (FRS), obsessiveness (OBS), depression (DEP), health concerns (HEA), bizarre mentation (BIZ), anger (ANG), cynicism (CYN), antisocial practices (ASP), type A (TPA), low self-esteem (LSE), social discomfort (SOD), family problems (FAM), work interference (WRK), and negative treatment indicators (TRT).

In our study, MMPI-2 profiles met all of the following validity criteria: fewer than 30 item omissions, $L$-scale $\leq 65$, $F$-scale $\leq 100$, $K$-scale $\leq 65$, $F(b)$-scale $\leq 100$, variable response inconsistency $T$-score $\geq 80$, true response inconsistency $T$-score $\geq 80$, and raw $F-K$-score $\leq 11$. The MMPI-2 was evaluated by a trained physician (ME) to assess the personality habits of both mothers of MoA and typical developing children.

### Statistical analysis

The $t$-test was used to compare age and MMPI-2 clinical basic and content scales between mothers of MoA children and typical developing children. Pearson’s correlation test was used to evaluate the relation between MMPI-2 scores of mothers of MoA children and frequency, intensity, and duration of migraine attacks of their children. $P < 0.05$ was considered statistically significant.

### Results

The two study groups were not significantly different for age ($8.93 \pm 3.57$ years in MoA group vs $8.74 \pm 3.57$ in control group, $P = 0.519$) or sex (ratio male:female $153:116$ in MoA group vs $316:271$ in control group, $P = 0.449$).

Among the MoA clinical characteristics, in the MoA group the attacks occurred with a mean frequency of $10.21 \pm 2.69$ a month, a mean duration of $5.92 \pm 4.09$ hours, and a mean intensity of $6.95 \pm 3.41$, according to VAS parameters. In the MMPI-2 clinical basic scale, the mothers of MoA children showed significantly higher scores in the Pa and Si ($P < 0.001$) subscales than mothers of typical developing children (Table 1 and Figure 1).

Table 1 and Figure 2 summarize the differences between the MMPI-2 results in mothers of MoA children in respect of mothers’ comparisons for the content scale. Pearson’s correlation analysis showed a significantly positive relationship between MoA clinical characteristics of studied children and MMPI-2 scores of their mothers. In particular, the MoA frequency of children was significantly positively related with ANX ($r = 0.4903$, $P = 0.024$) and LSE ($r = 0.5130$, $P = 0.017$) MMPI-2 scores of their mothers.

On the other hand, the MoA duration of children was significantly positively related with Hs ($r = 0.6155$, $P = 0.003$), Hy ($r = 0.6235$, $P = 0.003$), Pa ($r = 0.5102$, $P = 0.018$), Pt ($r = 0.4806$, $P = 0.027$), Sc ($r = 0.4350$, $P = 0.049$), ANX ($r = 0.4332$, $P = 0.050$), and HEA ($r = 0.7039$, $P < 0.001$) MMPI-2 scores of their mothers.

### Discussion

The main findings of the present study suggested that the personality of mothers of children affected by MoA tends...
Overall behavioral disorders have been reported as specifically, internalizing symptoms are common in children with headaches, while externalizing symptoms (eg, rule-breaking and aggressivity) are not significantly more common than in controls. Specifically, internalizing symptoms are common in children with headaches, while externalizing symptoms (eg, rule-breaking and aggressivity) are not significantly more common than in controls. On the other hand, in 2008 Radat et al showed a higher prevalence of anxiety and depression in children affected by MoA, while other reports showed low levels of self-concept, higher prevalence of harm-avoidance temperament style, and other new and suggestive comorbidities.

Alternatively, psychiatric disorders that run in families, specifically anxiety and mood disorders, are particularly frequent in migraineurs and their relatives, and children affected by migraine seem to be characterized by an higher prevalence of psychiatric disorders in parents than comparisons, suggesting that a sort of genetic cotransmission of anxiety and depression traits could exist in migraineurs, and evidence is pointing in this direction. Even though many reports have shown the co-occurrence of psychiatric symptoms in subjects affected by migraine, there have been no specific reports on the personality aspect of mothers not affected by headache who have children with MoA.

Moreover, social learning theory postulates that children’s perception of their physical symptoms can be altered via parental modeling, which may affect the expression of pain and functionally somatic symptoms. Children with recurrent unexplained pain report more models and positive reinforcement for pain behavior than children with recurrent explained pain. Parental stress and psychopathology may also play a role in organic diseases, such as MoA.

Family factors, such as parenting styles and family functioning, may be linked with disability levels across children’s physical health problems. However, this body of literature is limited by lack of clarity in distinguishing between individual parenting factors (eg, parenting style), dyadic variables (eg, parent–child communication), and family-level variables (eg, family functioning). Clinical studies of children with recurrent headaches and abdominal pain show that their parents report greater levels of family problems, marital problems, divorce and child physical abuse, which we could hypothetically also link to the higher levels in mothers of MoA children of some MMPI-2 scores: ANX, OBS, DEP, HEA, BIZ, CYN, TPA, LSE, WRK, and TRT ($P < 0.001$ for all variables). Specifically, regarding the greater levels of TPA and CYN, we could hypothesize that the personal traits of rigidity and ambition in mothers could impact on the coping-strategy

### Table 1 Differences in clinical basic scale and in content scale of MMPI-2 test among mothers of MoA and typical developing children (controls)

<table>
<thead>
<tr>
<th></th>
<th>MoA (n = 269)</th>
<th>Controls (n = 587)</th>
<th>P</th>
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</thead>
<tbody>
<tr>
<td>Hs</td>
<td>56.905 ± 13.171</td>
<td>54.979 ± 15.556</td>
<td>0.075</td>
</tr>
<tr>
<td>D</td>
<td>54.914 ± 9.743</td>
<td>53.292 ± 10.999</td>
<td>0.276</td>
</tr>
<tr>
<td>Hy</td>
<td>49.762 ± 10.163</td>
<td>48.500 ± 9.147</td>
<td>0.067</td>
</tr>
<tr>
<td>Pd</td>
<td>52.476 ± 8.813</td>
<td>53.396 ± 9.346</td>
<td>0.170</td>
</tr>
<tr>
<td>Mf-f</td>
<td>53.809 ± 7.639</td>
<td>52.354 ± 12.828</td>
<td>0.081</td>
</tr>
<tr>
<td>Pa</td>
<td>56.809 ± 11.931</td>
<td>50.917 ± 9.380</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Pt</td>
<td>52.667 ± 13.904</td>
<td>51.479 ± 12.331</td>
<td>0.207</td>
</tr>
<tr>
<td>Sc</td>
<td>55.524 ± 10.299</td>
<td>54.125 ± 11.139</td>
<td>0.077</td>
</tr>
<tr>
<td>Ma</td>
<td>54.619 ± 14.589</td>
<td>52.937 ± 13.759</td>
<td>0.099</td>
</tr>
<tr>
<td>Si</td>
<td>54.762 ± 8.927</td>
<td>50.042 ± 8.490</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>ANX</td>
<td>59.814 ± 9.943</td>
<td>50.958 ± 15.067</td>
<td>0.065</td>
</tr>
<tr>
<td>FRS</td>
<td>58.667 ± 11.114</td>
<td>56.792 ± 15.067</td>
<td>0.001</td>
</tr>
<tr>
<td>OBS</td>
<td>57.809 ± 11.931</td>
<td>50.333 ± 8.740</td>
<td>0.001</td>
</tr>
<tr>
<td>DEP</td>
<td>54.524 ± 9.948</td>
<td>49.042 ± 7.217</td>
<td>0.001</td>
</tr>
<tr>
<td>HEA</td>
<td>61.571 ± 11.902</td>
<td>52.375 ± 7.731</td>
<td>0.001</td>
</tr>
<tr>
<td>BIZ</td>
<td>59.381 ± 11.491</td>
<td>52.333 ± 7.054</td>
<td>0.001</td>
</tr>
<tr>
<td>ANG</td>
<td>50.809 ± 9.943</td>
<td>49.250 ± 12.078</td>
<td>0.061</td>
</tr>
<tr>
<td>CYN</td>
<td>59.714 ± 11.136</td>
<td>53.875 ± 10.878</td>
<td>&lt;0.001</td>
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<tr>
<td>ASP</td>
<td>53.095 ± 8.431</td>
<td>51.729 ± 10.860</td>
<td>0.065</td>
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<tr>
<td>TPA</td>
<td>57.571 ± 11.952</td>
<td>51.542 ± 9.563</td>
<td>&lt;0.001</td>
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<tr>
<td>LSE</td>
<td>56.381 ± 8.640</td>
<td>48.792 ± 6.461</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SOD</td>
<td>53.381 ± 11.084</td>
<td>52.583 ± 12.683</td>
<td>0.379</td>
</tr>
<tr>
<td>FAM</td>
<td>51.095 ± 8.312</td>
<td>50.896 ± 8.745</td>
<td>0.749</td>
</tr>
<tr>
<td>WRK</td>
<td>57.190 ± 9.647</td>
<td>49.854 ± 5.975</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>TRT</td>
<td>57.667 ± 10.432</td>
<td>52.396 ± 7.718</td>
<td>&lt;0.001</td>
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Note: P < 0.05 was considered statistically significant (t-test).

**Abbreviations:** MMPI-2, Minnesota Multiphasic Personality Inventory – second edition; MoA, migraine without aura; Hs, hypochondriasis; D, depression; Hy, hysteria; Pd, psychopathic deviate; Mf-f, masculinity/femininity; Pa, paranoia; Pt, psychasthenia; Sc, schizophrenia; Ma, hypomania; Si, social introversion; ANX, anxiety; FRS, fears; OBS, obsessiveness; DEP, depression; HEA, health concerns; BIZ, bizarre mentation; ANG, anger; CYN, cynicism; ASP, antisocial practices; TPA, type A; LSE, low self-esteem; SOD, social discomfort; FAM, family problems; WRK, work interference; TRT, negative treatment indicators.
development of children affected by migraine, as the maternal cynism (CYN) could act too. Conversely, a potential link between children’s internalizing disorders, parental psychopathology and headaches has been established.\textsuperscript{72} Fagan reported that migraine may be associated with dysfunctional parenting patterns, suggesting that in families where the mother has migraine, children may be at risk of inappropriately or prematurely assuming roles for which they are developmentally unready.\textsuperscript{73} On the other hand, migraine

\begin{figure}[h]
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\includegraphics[width=\textwidth]{figure1}
\caption{Comparisons in MMPI-2 clinical basic scales results between mothers of MoA children and mothers of control children.}
\textbf{Abbreviations:} MMPI-2, Minnesota Multiphasic Personality Inventory – second edition; MoA, migraine without aura; Hs, hypochondriasis; D, depression; Hy, hysteria; Pd, psychopathic deviate; Mf-f, masculinity/femininity; Pa, paranoia; Pt, psychasthenia; Sc, schizophrenia; Ma, hypomania; Si, social introversion.
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2}
\caption{Comparisons in MMPI-2 content scales results between mothers of MoA children and mothers of control children.}
\textbf{Abbreviations:} MMPI-2, Minnesota Multiphasic Personality Inventory – second edition; MoA, migraine without aura; ANX, anxiety; FRS, fears; OBS, obsessiveness; DEP, depression; HEA, health concerns; BIZ, bizarre mentation; ANG, anger; CYN, cynicism; ASP, antisocial practices; TPA, type A; LSE, low self-esteem; SOD, social discomfort; FAM, family problems; WRK, work interference; TRT, negative treatment indicators.
\end{figure}
has been also interpreted as a sort of altered communication by children in order to consolidate some intrafamilial trajectories.74,75

Alternatively, our findings seem to suggest a potential role of some maternal personality traits (such as Hs, Hy, Pa, Pt, Sc, ANX, and HEA) in children affected by MoA duration perception (Hs, \( r = 0.6155 \), \( P = 0.003 \); Hy, \( r = 0.6235 \), \( P = 0.003 \); Pa, \( r = 0.5102 \), \( P = 0.018 \); Pt, \( r = 0.4806 \), \( P = 0.027 \); Sc, \( r = 0.4350 \), \( P = 0.049 \); ANX, \( r = 0.4332 \), \( P = 0.050 \); and HEA, \( r = 0.7039 \), \( P < 0.001 \)) and MoA frequency (ANX, \( r = 0.4903 \), \( P = 0.024 \); and LSE, \( r = 0.5130 \), \( P = 0.017 \)). In fact, we could speculate that some maternal personality traits such as ANX or HEA could alter the health-status perception of children and correct coping strategies, also considering that active coping strategies correspond to intrinsically determined behavior, whereas passive coping corresponds to extrinsically determined behavior with reduced aggression.76

Moreover, passive coping strategies have been reported to be associated with high degrees of headache intensity.77 Several other coping strategies have been described, but in view of the limited number of studies evaluating them, these strategies were considered less determinant for the study of migraine outcomes.59 In this perspective, we could consider our results on the relationship between MMPI-2 basic scales results of mothers, and migraine attacks duration of their children, as the effect of abnormal mothers’ coping styles linked to their peculiar personality profiles.

Obviously, we cannot affirm that maternal personality traits play a causative role in MoA disease, because migraine is undoubtedly a neurological disease78,79 and accompanied by many comorbidities at developmental ages14–19 that impact on quality-of-life levels in children affected.

We should take into account a couple of limitations of this study: (1) our data were derived from the administration of a single personality-assessment device and not from a psychiatric clinical evaluation, and (2) we focused only on children affected by MoA, and other types of primary headaches were not considered.

Notwithstanding these limitations, the present study indicates the potential value of maternal personality assessment for better comprehension and clinical management of children affected by migraine, even if further longitudinal studies on the other primary headaches are needed.

In conclusion, our findings could suggest a broader approach to the family of children affected by migraine, with particular attention to the principal caregiver.

Disclosure
The authors report no conflicts of interest in this work.

References
64. Gonda X, Rihmer Z, Zsombok T, Bagdy G. High anxiety and migraine are associated with the α allele of the 5HTTLPR gene polymorphism. Psychiatr Res. 2007;149:261–266.


