

Alexithymia as a Screening Index for Male Conscripts with Adjustment Disorder

Po-Fei Chen · Cheng-Sheng Chen · Cheng-Chung Chen ·
For-Wey Lung

Published online: 29 October 2010
© Springer Science+Business Media, LLC 2010

Abstract This study investigated both whether alexithymia is a predictor for mental health and adjustment disorder, and its pathway relationships. Total of 158 young male conscripts diagnosed with adjustment disorder and another 155 young normal male controls were enrolled. Structural equation modeling showed, parental bonding influence personality, then affects alexithymic traits, and then affects mental health, finally further develop adjustment disorder. Receiver operating characteristic (ROC) found the optimal cutoff point for screening of adjustment disorder using DIF of the TAS-20 was 21/22, resulting in a sensitivity of 0.84, specificity of 0.87, PPV of 0.87, and NPV of 0.84. The DIF of alexithymia can be used as a screening index for adjustment disorder. With the high degree of association

P.-F. Chen
Department of Psychology, Kaohsiung Medical University, Kaohsiung, Taiwan

C.-S. Chen · C.-C. Chen
Kaohsiung Medical University Chung-Ho Memorial Hospital, Kaohsiung, Taiwan

C.-C. Chen
Kai-Suan Psychiatric Hospital, Kaohsiung, Taiwan

F.-W. Lung
Center for Genetic Laboratory and Faculty Development, Kaohsiung Armed Forces
General Hospital, Kaohsiung, Taiwan

F.-W. Lung
Department of Neurology, Kaohsiung Medical University, Kaohsiung, Taiwan

F.-W. Lung
Department of Psychiatry, National Defense Medical Center, Taipei, Taiwan

F.-W. Lung
Calo Psychiatric Center, Pingtung, Pingtung County, Taiwan

F.-W. Lung (✉)
Department of Psychiatry, Kaohsiung Armed Forces General Hospital,
No. 2 Chung Cheng 1st Rd., Kaohsiung, Taiwan
e-mail: forwey@seed.net.tw

between alexithymia and other psychiatric disorders, especially in those relatively lacking in the ability to empathize, future studies should investigate whether DIF can be generalizable to the screening of other empathy-related and psychiatric disorders.

Keywords Alexithymia · Adjustment disorder · Mental health · Personality characteristics · Screening index

Introduction

Alexithymia is a trait of those who have difficulty in identifying their feelings, differentiating feelings, verbalizing feelings, and communicating feelings [1]. Since people with alexithymia are unable to identify their own feelings, they also have trouble identifying the emotional state of others, accordingly, alexithymics have been found to be relatively lacking in the ability to empathize [2–4]. However, the ability to empathize is an important component in building interpersonal relationships. Decety and Jackson [5] proposed a model of empathy which stated that for a person to be able to empathize, he/she needed to have an affective ability to respond to others, the cognitive ability to understand others' perceptions, and a regulatory mechanism which traces the feelings of self and other. Twin studies on alexithymia have investigated whether this is a genetically or family environment-induced trait [6–8]. Although previous studies have concluded that alexithymia is genetically influenced [6, 7], more recent studies support the hypothesis that alexithymia is caused by familial environment factors [8–11].

One of the familial factors which have been studied is the attachment relationship between alexithymics and their parents. Lemche and colleagues [11] conducted a follow-up study of 1–3-year-old children, and observed the emotional language development of these children and the attachment style they had with their parents. The researchers found that insecurely attached children showed a delay in the acquisition of mentalizing language, and children with a disorganized attachment lacked mentalizing language [11]. The deficiency in mentalized language caused these two groups of children to have difficulties in emotional regulation; therefore, they were at a higher risk of developing alexithymia as they grew up. Besides attachment, the relationship between parental rearing style and attachment has also been studied, and researchers have found that more alexithymics recalled a parental rearing style of overprotection or low care [10]. Patients with eating disorders, compared to controls, also had more alexithymic features, lower parental care, and a higher degree of protection [9].

Parenting style can affect the personality of an individual [12], consequently, personality characteristics have also been found to be related to alexithymia [8, 13, 14]. Alexithymia is negatively correlated with extroversion [13], and positively correlated with neurotic personality traits [8, 14].

Furthermore, alexithymia is associated with various psychiatric disorders, including eating disorder, dissociation, and substance abuse [9, 15, 16]. However, no previous study, to the best of our knowledge, has investigated the association between adjustment disorder and alexithymia. Adjustment disorder has been one of the most commonly diagnosed sub-threshold diagnoses since 1952 [17]. The stress-related diagnosis was more rigid in the DSM-III, and excluded bereavement and post-traumatic stress disorders [18–20]. Although adjustment disorder is a subthreshold diagnosis, it is associated with suicidality [21]. Since people with alexithymia have difficulty empathizing with others [2], and thus lack the skills to develop interpersonal relationships; we hypothesized that when under stress, people with

alexithymia will be at higher risk of developing adjustment disorder, since they lack the interpersonal resources to help them deal with the stress, and do not have the ability to release their own emotions caused by the stress. Thus, a reliable and valid instrument for early identification and differential diagnosis of adjustment disorder is important [22, 23].

In addition to alexithymia, numerous previous studies have found that parental bonding and personality characteristics have an effect on the development of adjustment disorder [24–26]. Previous research in this area showed that those who had neurotic, introverted and psychotic traits were at a higher risk for adjustment disorder [25], and maternal overprotection, neuroticism and introversion also increased the risk for male adjustment disorders comorbid with hyperventilation syndrome [26]. Furthermore, it was found that males who had adjustment problems due to their homosexual tendencies also recalled paternal overprotection [27]. In terms of the combined effect, Lung and colleagues [24] investigated the causal relationship between parental bonding, personality characteristics and adjustment disorder, and found males who were overprotected by their mothers, and who had a higher level of neuroticism and lower level of extraversion, had an increased risk of suffering from adjustment disorder.

Previous studies have already shown that parental bonding and personality characteristics have an effect on both alexithymia and adjustment disorder. And, we are already certain that parental bonding causes personality characteristics, which cause adjustment disorder [24, 26]. However, the role which alexithymia plays in this model is uncertain. Since there is a high degree of association between alexithymia and psychiatric disorders, it is understandable why many people with psychiatric disorders have interpersonal relationship difficulties.

Therefore, our study aimed to investigate both whether alexithymia is a predictor for mental health and adjustment disorder, and its pathway relationships with parental rearing style and personality characteristics. If alexithymia is a precipitating factor for adjustment disorder, it can be used as an efficient and cost-effective screening instrument for mental health.

Methods

Participants

In Taiwan, all males 19 years of age and older are required to serve in the military; a portion of these young males will have difficulty adjusting to military life, and some will even develop clinically significant symptoms of adjustment disorder [25]. These young males with adjustment disorder were referred to the psychiatric department. We recruited 158 young males, who met the DSM-IV criteria for a diagnosis of adjustment disorder [20], from the psychiatric department of a teaching hospital in southern Taiwan. Another group of 155 young normal male controls were also recruited. All participants gave their written informed consent after detailed explanation of the study. The protocol of this study was approved by the institutional review board of a teaching hospital.

Materials

Research data was collected by self-administered questionnaires. After detailed explanation of the purpose of the research, participants signed informed consent forms and filled out the questionnaires. If there were any questions, the researcher would answer

accordingly, otherwise the surveys were filled out independently. Demographic information was collected and four questionnaires: the Parental Bonding Inventory (PBI), Eysenck Personality Inventory (EPI), the 20-item Toronto Alexithymia Scale (TAS-20), and the Chinese Health Questionnaire (CHQ) were answered.

The PBI is a 25-item self-report questionnaire designed to measure the individual's recollection of the parental rearing style in the first 16 years of life. There are 12 items measuring the dimension of care and 13 items measuring protection. The rearing style of both parents is evaluated. The caring dimension refers to parental care and involvement versus rejection, and the protection dimension refers to parental control and overprotection versus promotion of autonomy. The Chinese version of the PBI has demonstrated high internal consistency (Cronbach's $\alpha = 0.65\text{--}0.73$) and reliability (test–retest reliability = $0.66\text{--}0.88$) [28].

The EPI is a 25-item self-report inventory measuring the personality characteristics of extraversion and neuroticism. There are 14 neuroticism items measuring an individual's emotional dysfunction, and 11 extraversion items measuring an individual's sociability. This Chinese version has demonstrated a high internal consistency of 0.90 [29].

The TAS-20 is a 20-item self-report inventory measuring alexithymia as a three-dimensional construct of (1) difficulty identifying feelings (DIF), (2) difficulty describing feelings (DDF) and (3) externally-oriented thinking (EOT), which means the predisposition to focus on external events rather than on one's own inner experience [30]. The Taiwanese version of the TAS-20 has shown good fit for the three-factor model, and a good internal consistency [31].

The CHQ is a self-administered screening instrument used to identify minor psychiatric disorders in community or non-psychiatric departments. The CHQ was modified from the General Health Questionnaire developed by Goldberg [32]. Cheng and Williams used the structure and concept of the General Health Questionnaire and modified it into the 12-item brief psychiatric screening test [33]. Cheng, Wu, Chong and Williams demonstrated an internal consistency of 0.79 for the CHQ [34].

Statistical Analysis

This study used SPSS 17.0 for Windows package software (SPSS Inc, Chicago, USA) for statistical analysis and organization of the data. Descriptive analysis of demographics and logistic regression was done using SPSS, and structural equation analysis was performed using AMOS 7.0 for Windows (SPSS Inc, Chicago, USA). The chi-square fit test was used in the structural equation modeling to investigate the overall fit of the model; Models resulting in non-significant chi-square (P values greater than 0.05 and goodness-of-fit greater than 0.9), a root mean square error of approximation (RMSEA) of 0.05 (0.08) or less indicated that the model adequately described the observed data. Finally, the receiver operating characteristic (ROC) curve was used to determine the optimum cutoff point of the TAS for adjustment disorder.

Results

Demographic Distribution

Of the 313 participants, 158 were diagnosed with adjustment disorder and 155 were controls. All participants were male, and aged from 18 to 27 years. The mean age of the

adjustment group was 21.46 (SD = 2.35), and the control group, 22.94 (SD = 2.26). The level of education of these participants is shown in Table 1.

Logistic Regression

Demographics (age and level of education), parental bonding, personality characteristics, alexithymic traits and mental health condition were analyzed using logistic regression to investigate which factors were predictive of adjustment disorder. The results showed that those with younger age ($\beta = -0.16$, $P < 0.001$), a higher degree of neurotic personality traits ($\beta = 0.23$, $P < 0.001$), worse mental health condition ($\beta = 0.46$, $P < 0.001$), and a higher degree of the alexithymic trait of DIF ($\beta = 0.15$, $P = 0.016$) had a greater tendency to develop adjustment disorder. The results are shown in Table 2.

Structural Equation Model

Three structural equation models were analyzed. The first model investigated the pathway relationship of parental bonding, personality, alexithymic traits and mental health condition between the males with adjustment disorder and the controls (Fig. 1). In the second model, mental health condition was removed to investigate, without the mediating factor of mental health, whether these factors have a direct effect on adjustment disorder (Fig. 2a). Lastly, a parsimonious model is presented, with only those factors affecting adjustment disorder being shown (Fig. 2b).

Table 1 Demographic distribution differences between adjustment disorder and controls ($N = 313$)

	Adjustment disorder ($n = 158$) Mean (SD)	Controls ($n = 155$) Mean (SD)	P
Age	21.46 (2.35)	22.94 (2.26)	<0.001
	n (%)	n (%)	P
Education			0.009
Elementary	2 (50.0)	2 (50.0)	
High school	50 (41.0)	72 (59.0)	
College/university	85 (51.8)	79 (48.2)	
Graduate	18 (78.3)	5 (21.7)	

Table 2 Parsimonious linear logistic regression results of demographics, parental bonding, personality characteristics, alexithymic traits and mental health condition in relation to the predictability of adjustment disorder

Factor	β	t	P
Age	-0.16	-4.79	<0.001
Neuroticism	0.23	4.10	<0.001
Difficulty describing feelings	0.15	2.41	0.016
Mental health condition	0.46	8.48	<0.001

Dependent variable: group (dummy variables: 1 = adjustment disorder, 0 = control)

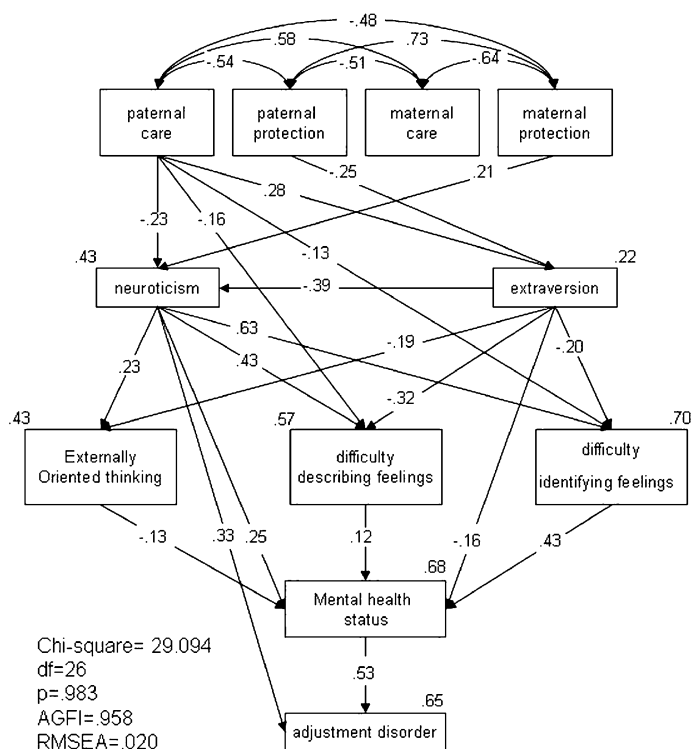


Fig. 1 The pathway relationship of parental bonding, personality, alexithymic traits and mental health condition between males with adjustment disorder and controls. *AGFI* adjusted goodness-of-fit, *RMSEA* root mean square error of approximation, adjustment disorder (dummy variable: 1 = adjustment disorder group, 0 = controls)

All three models showed the pathway of parental bonding affecting personality, which affects alexithymic traits, which then influences mental health, thus leading to a greater tendency to develop adjustment disorder. The first model, with all factors shown, resulted in an adjusted goodness-of-fit (AGFI) of 0.958 (>0.9), RMSEA of 0.020 (<0.080), and P value of 0.307 (>0.05), thus showing that the model accurately described the observed data (Fig. 1). The results showed that the fathers had a greater effect on the males with adjustment disorder than the mothers, with those perceiving more paternal care less likely to have neurotic traits ($\beta = -0.23$, $P < 0.001$), and more likely to have extraverted personality traits ($\beta = 0.28$, $P < 0.001$), and a lower degree of the alexithymic traits of DDF ($\beta = -0.16$, $P < 0.001$) and DIF ($\beta = -0.13$, $P < 0.001$). Those perceiving a higher level of paternal protection were less likely to have extraverted personality characteristics ($\beta = -0.25$, $P < 0.001$). Those with greater extraverted personality characteristic tendencies were less likely to have neurotic characteristics ($\beta = -0.39$, $P < 0.001$), EOT ($\beta = -0.19$, $P = 0.003$), DDF ($\beta = -0.32$, $P < 0.001$) and DIF ($\beta = -0.20$, $P < 0.001$), and had less psychological distress ($\beta = -0.16$, $P < 0.001$). Those with a higher level of neurotic characteristics were more likely to have EOT ($\beta = 0.23$, $P < 0.001$), DDF ($\beta = 0.43$, $P < 0.001$) and DIF ($\beta = 0.63$, $P < 0.001$), a higher level of psychological distress ($\beta = 0.23$, $P < 0.001$) and adjustment disorder ($\beta = 0.33$, $P < 0.001$). Those with a higher degree of the alexithymic trait of EOT had less psychological distress ($\beta = -0.12$,

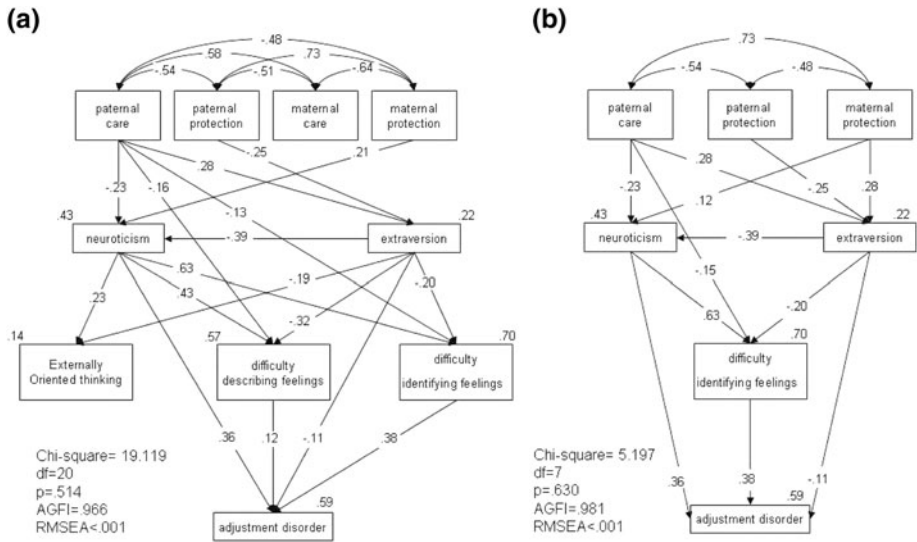


Fig. 2 The pathway relationship of parental bonding, personality and alexithymic traits between males with adjustment disorder and controls: **a** the complete model, **b** parsimonious model. AGFI adjusted goodness-of-fit, RMSEA root mean square error of approximation, adjustment disorder (dummy variable: 1 = adjustment disorder group, 0 = controls)

$P < 0.001$), and those with higher levels of DDF and DIF were more likely to have psychological distress ($\beta = 0.12$, $P = 0.041$; $\beta = -0.43$, $P < 0.001$). Lastly, those with more psychological distress were more likely to develop adjustment disorder ($\beta = 0.53$, $P < 0.001$).

The second model removed the factor of psychological distress; the model showed alexithymic factors had a direct impact on adjustment disorder. This model resulted in an AGFI of 0.966, RMSEA of less than 0.001 and a P value of 0.514 (Fig. 2a). Factors which directly impacted adjustment disorder included extraversion, neuroticism and DIF. Those less extraverted, more neurotic, and with more DIF were more likely to develop adjustment disorder ($\beta = -0.11$, $P = 0.003$; $\beta = 0.36$, $P < 0.001$; $\beta = 0.38$, $P < 0.001$).

The third parsimonious model is shown in Fig. 2b. The model resulted in an AGFI of 0.981, RMSEA of less than 0.001 and a P of 0.630. The variances of extraversion, neuroticism, DIF, and adjustment disorder were 22, 43, 70 and 59%, respectively.

ROC

The ROC curve was used to determine the optimum cutoff point of the TAS-20 for adjustment disorder. Since DIF was the only factor within TAS which was predictive of adjustment disorder, it was the only factor used as the index for adjustment disorder. The use of DIF as an indicator for adjustment disorder resulted in an area under the curve of 0.926. The optimum cutoff point of DIF obtained from the ROC curve was 21, with those scoring equal to and higher than 22 having a risk for adjustment disorder. Using the 21/22 cutoff point, sensitivity was 0.84, specificity was 0.87, positive predictive value (PPV) was 0.87, and negative predictive value (NPV) was 0.84.

Discussion

Our results showed that alexithymia is a predictor for mental health and adjustment disorder. In addition, within the model of parental bonding, personality characteristics and mental health, alexithymia was a mediating factor between personality characteristics and mental health, resulting in a pathway of parental bonding influencing personality characteristics, personality characteristics affecting alexithymic traits, and alexithymic traits affecting mental health, and thereby, a greater likelihood of developing adjustment disorder. Within this group of males with adjustment disorder, high levels of paternal care and paternal and maternal protection had an effect on personality characteristics. Those less extraverted and more neurotic were more likely to develop alexithymia. Of the three factors in the TAS-20, the factor of DIF had a direct effect on adjustment disorder, and the above-mentioned factors accounted for a 59% variance within our sample. Since DIF was a precipitating factor for adjustment disorder, ROC analysis found the optimal cutoff point for the screening of adjustment disorder was 21/22, with those scoring equal to and higher than 22 having a risk for adjustment disorder. Using the 21/22 cutoff point, sensitivity was 0.84, specificity was 0.87, PPV was 0.87, and NPV was 0.84.

In the pathway relationship among parental bonding, personality characteristics, alexithymic traits and mental health, we found a pathway of parental bonding influencing personality characteristics, personality characteristics affecting alexithymic traits, and alexithymic traits affecting mental health, and thereby, a greater likelihood of developing adjustment disorder (Figs. 1, 2). Among males with adjustment disorder, perceived childhood parental overprotection and a low level of care had a perpetuating effect on alexithymia. Previous studies found similar results in that alexithymics recalled a parental rearing style of overprotection or low care [9, 10]. In addition, we found patients with higher levels of neuroticism and lower levels of extraversion were more likely to have alexithymic traits; this is consistent with previous studies which found neuroticism had a positive correlation [13] and extraversion a negative correlation with alexithymia [8, 14]. Alexithymia has been found to be related to personality [8, 14] and it is also relatively stable over time [35]; some researchers even proposed it as a personality characteristic [36]. Krystal proposed that personality characteristics may contribute to alexithymic characteristics [37]. A study categorized alexithymia as a stable personality characteristic, with some factors that are state-dependent [35]. Even though previous studies have found that parental bonding and personality characteristics both have an effect on alexithymia, these effects were studied separately. In addition, the causal relationship between personality characteristics and alexithymia is still uncertain. Our study found a tentative model for the causal relationship between parental bonding, personality characteristics and alexithymia. We found that alexithymia was a mediating factor between personality characteristics and mental health within the model of parental bonding, personality characteristics and mental health, as established and supported by previous studies [24, 26, 27].

We found that alexithymia increases psychological distress; thus, alexithymics are more likely to develop adjustment disorder. Previous studies have found alexithymia to be a risk factor for higher levels of psychological distress and psychiatric disorders [38]. We further found that without the factor of psychological distress, alexithymia had a direct effect on adjustment disorder, thus it is a predictor for adjustment disorder. The TAS-20 includes the three alexithymic factors of DIF, DDF and EOT, and of these three factors, only DIF had a direct effect on adjustment disorder. A previous Japanese study also found that adolescents with psychosomatic and/or behavioral problems scored significantly higher than normal adolescents on the DIF index. Another Japanese study found that DIF correlated positively

with the Rorschach reserved responses to emotional stimuli (Sum C') and stimulus demand (Adj es), showing that these individuals experience constricted feelings [39].

Besides the factor of DIF, the cultural context of EOT as a protective factor for psychological distress shown in our study should be noted. The term alexithymia has been found to be closely tied with psychosomatic disorders [40]. Previous studies have found that Chinese-language speakers scored higher overall on the TAS-20 than native English speakers, showing that they are culturally more somatically-oriented than those in Western cultures [41]. Lutz stated that emotion is a “cultural and interpersonal product” of the process of interpersonal relationships with each other [42]. Thus it is a “social rather than an individual achievement” [42]. EOT would therefore be preferred and fit within the cultural values of Eastern societies [43]. This shows that cultural context is important in studying emotional expression, because emotional expression is tightly related to self constructs, and its relationship with others [44].

Alexithymics have been found to be relatively lacking in the ability to empathize [2–4]; thus, they have greater difficulty adjusting to social situations, such as that of a group living arrangement, as in the military setting in Taiwan. Currently, the CHQ is used as the screening instrument for psychological distress in military conscripts [24–26]; however, the CHQ can only reflect psychological distress after the conscripts have already had problems adjusting to military life. Thus, a more stable precipitating factor that can predict adjustment disorder is needed. With a high accountable variance of 59% for adjustment disorder, and high sensitivity, specificity, PPV and NPV, the alexithymic factor of DIF can be used as an effective and efficient screening instrument for susceptibility to the future development of adjustment disorder.

Furthermore, one of the core symptoms of pervasive developmental disorder is the deficit in social interaction [20]. Therefore, alexithymia has been proposed to have considerable overlap with Asperger's syndrome [45, 46]. If we view alexithymia as a deficit in the theory of mind, then disorders lacking in the ability to empathize should also contain alexithymic traits. These “empathy disorders” includes attention-deficit/hyperactivity disorder, pervasive developmental disorders not otherwise specified, Tourette and other tic disorders, obsessive–compulsive disorder, obsessive–compulsive personality disorder, other personality disorders, eating disorders, selective mutism, childhood schizophrenia, bipolar disorder, conduct disorder and oppositional-defiant disorder [47]. Thus, we hypothesize the use of DIF in alexithymia as an indicator for the screening of adjustment disorder may also be used in the screening of the “empathy disorder” mentioned above. Whether alexithymic factors can be generalizable to the screening of other empathy disorders needs to be investigated in future studies.

One of the limitations of our study is that the sample used in our study is from the military. However, since all males above the age of 18 are required by law to enter the military in Taiwan, our sample is a moderately good representation of the young male population in Taiwan. Also within the sampling method, the second limitation of our study is that although we attempted to control the factor of age between the subject and control groups, the small age range in our sample meant that a year difference in the mean age of the control group and the subject group still resulted in a statistically significant age difference between the two groups. The third limitation of our study is that only males were included. It is uncertain whether there would be a gender difference in the etiology of adjustment disorder and its relationship with parental bonding, personality and alexithymia. Thus, more studies will be needed in this area of research. Lastly, although previous studies have found alexithymia to be a relatively stable trait [35, 36], other studies have found it to change with the symptoms of depression in pregnant women [48]; DIF was one

of the factors found to be state-dependent [35]. Thus, further longitudinal studies are needed to investigate whether DDF can be used as a long-term future predictor for psychological distress and adjustment disorder.

Besides the above mentioned limitations, our study proposed a model for the pathway relationship between parental bonding, personality characteristics, alexithymia, psychological distress and adjustment disorder. Furthermore, we also found that the DIF sub-scale within the TAS-20 can be used as a screening instrument for adjustment disorder in young males in Taiwan. Furthermore, the cut-off point of 21/22 demonstrates good sensitivity, specificity, PPV and NPV for adjustment disorder. Whether this screening method can be generalized to other empathy disorders or other cultural contexts needs to be further studied.

Acknowledgments This study was supported by a grant (numbers DOD98-56) from the Medical Affairs Bureau, Ministry of National Defense, Taiwan. Also, the authors would like to acknowledge all researchers who assisted in this study. Special thanks to Dr. Yu-Chen Lin for giving us permission to use the TAS-20 for this study.

References

1. Taylor GJ: Alexithymia: Concept, measurement, and implications for treatment. *American Journal of Psychiatry* 141:725–732, 1984
2. Moriguchi Y, Decety J, Ohnishi T, et al.: Empathy and judging other's pain: An fMRI study of alexithymia. *Cerebral Cortex* 17:2223–2234, 2007
3. Moriguchi Y, Ohnishi T, Lane R, et al.: Impaired self-awareness and theory of mind: An fMRI study of mentalizing in alexithymia. *Neuroimage* 32:1472–1482, 2006
4. Nishimura H, Komaki G, Igarashi T, et al.: Validity issues in the assessment of alexithymia related to the developmental stages of emotional cognition and language. *BioPsychoSocial Medicine* 3:12, 2009
5. Decety J, Jackson PL: The functional architecture of human empathy. *Behavioral and Cognitive Neuroscience Reviews* 3(2):71–100, 2004
6. Heiberg A, Heiberg A: Alexithymia—an inherited trait: A study of twins. *Psychotherapy and Psychosomatics* 28:221–225, 1976
7. Heiberg AN, Heiberg A: A possible genetic contribution to the alexithymia trait. *Psychotherapy and Psychosomatics* 30:205–210, 1978
8. Valera EM, Berenbaum H: A twin study of alexithymia. *Psychotherapy and Psychosomatics* 70:239–246, 2001
9. De Panfilis C, Rabbaglio P, Rossi C, et al.: Body image disturbance, parental bonding and alexithymia in patients with eating disorders. *Psychopathology* 36:239–246, 2003
10. Kooiman CG, van Rees Vellinga S, Spinhoven P, et al.: Childhood adversities as risk factors for alexithymia and other aspects of affect dysregulation in adulthood. *Psychotherapy and Psychosomatics* 73:107–116, 2004
11. Lemche E, Klann-Delius G, Koch R, et al.: Mentalizing language development in a longitudinal attachment sample: Implications for alexithymia. *Psychotherapy and Psychosomatics* 73:366–374, 2004
12. Schaefer ES: A configurational analysis of children's reports of parent behavior. *Journal of Counseling Psychology* 29:552–557, 1965
13. Bermond B, Vorst HCM, Vingerhoets AJJM, et al.: The Amsterdam Alexithymia Scale: Its psychometric values and correlations with other personality traits. *Psychotherapy and Psychosomatics* 68:241–251, 1999
14. De Gucht V, Fontaine J, Fischler B: Temporal stability and differential relationships with neuroticism and extraversion of the three subscales of the 20-item Toronto Alexithymia Scale in clinical and nonclinical samples. *Journal of Psychosomatic Research* 57:25–33, 2004
15. Modestin J, Lotscher K, Erni T: Dissociative experiences and their correlates in young non-patients. *Psychology and Psychotherapy* 75:53–64, 2002
16. Taylor GJ, Parker JDA, Bagby RM: A preliminary investigation of alexithymia in men with psychoactive substance dependence. *American Journal of Psychiatry* 147:1228–1230, 1990

17. Strain JJ, Diefenbacher A: The adjustment disorders: The conundrums of the diagnoses. *Comprehensive Psychiatry* 49:121–130, 2008
18. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, 3rd revised edn. Washington, DC, American Psychiatric Association, 1987
19. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, 4th edn. Washington, DC, American Psychiatric Association, 1994
20. American Psychiatric Association: *Diagnostic and Statistical Manual of Mental Disorders*, 4th edn., text revision. Washington, DC, American Psychiatric Association, 2000
21. Runeson BS, Beskow J, Waern M: The suicidal process in suicides among young people. *Acta Psychiatrica Scandinavica* 93:35–42, 1996
22. Akechi T, Okuyama T, Sugawara Y, et al.: Major depression, adjustment disorders, and post-traumatic stress disorder in terminally ill cancer patients: Associated and predictive factors. *Journal of Clinical Oncology* 22(10):1957–1965, 2004
23. Akizuki N, Akechi T, Nakanishi T, et al.: Development of a brief screening interview for adjustment disorders and major depression in patients with cancer. *Cancer* 97(10):2605–2613, 2003
24. Lung FW, Lee FY, Shu BC: The relationship between life adjustment and parental bonding in military personnel with adjustment disorder in Taiwan. *Military Medicine* 167:678–682, 2002
25. Lung FW, Lee FY, Shu BC: The premorbid personality in military students with adjustment disorder. *Military Psychology* 18:77–88, 2006
26. Shu BC, Chang YY, Lee FY, et al.: Parental attachment, premorbid personality, and mental health in young males with hyperventilation syndrome. *Psychiatry Research* 153(2):163–170, 2007
27. Lung FW, Shu BC: Father-son attachment and sexual partner orientation in Taiwan. *Comprehensive Psychiatry* 48:20–26, 2007
28. Shu BC, Lo WJ, Lung FW: The reliability and validity of Parental Bonding Instrument in Chinese version. *Nursing Research Taiwan* 7:479–489, 1999
29. Lu L: University transition: Major and minor life stressors, personality characteristics and mental health. *Psychological Medicine* 24:81–87, 1994
30. Taylor GJ: The alexithymia construct: Conceptualization, validation and relationship with basic dimensions of personality. *New Trends Experimental and Clinical Psychiatry* 10:61–74, 1994
31. Lin YC, Chan CH: A factor analysis of the Taiwan version of the Toronto Alexithymia Scale-20. *Taiwanese Journal of Psychiatry* 17:276–282, 2003
32. Goldberg D, Williams P: *A User's Guide to the General Health Questionnaire*. Windsor, UK, NFER-Nelson, 1972
33. Cheng TA, Williams P: The design and development of a screening questionnaire (CHQ) for use in community studies of mental disorders in Taiwan. *Psychological Medicine* 16:415–422, 1986
34. Cheng TA, Wu JT, Chong MY, et al.: Internal consistency and factor structure of the Chinese Health Questionnaire. *Acta Psychiatrica Scandinavica* 82:304–308, 1999
35. Saarijarvi S, Salminen JK, Toikka T: Temporal stability of alexithymia over a five-year period in outpatients with major depression. *Psychotherapy and Psychosomatics* 75:107–112, 2006
36. Taylor GJ, Bagby RM: New trends in alexithymia research. *Psychotherapy and Psychosomatics* 73:68–77, 2004
37. Krystal H: *Integration and Self-healing. Affect, Trauma, Alexithymia*. Hillsdale, Analytic Press, 1988
38. Lin YC, Chan CH: Alexithymia in non-psychiatric outpatients of a general hospital. *Taiwanese Journal of Psychiatry* 20:272–278, 2006
39. Akimoto M, Fukunishi I, Baba T, et al.: Alexithymia and sociocultural factors in a Japanese sample: A study with the Rorschach. *Psychological Reports* 90:205–211, 2002
40. Taylor GJ: Recent developments in alexithymia theory and research. *Canadian Journal of Psychiatry* 45(2):134–142, 2000
41. Dion KL: Ethnolinguistic correlates of alexithymia: Toward a cultural perspective. *Journal of Psychosomatic Research* 41(6):531–539, 1996
42. Lutz C: *Unnatural Emotions: Everyday Sentiments on a Micronesian Atoll and their Challenge to Eastern Theory*. Chicago, University of Chicago Press, 1988
43. Ryder AG, Yang J, Yao XZ, et al.: The cultural shaping of depression: Somatic symptoms in China, psychological symptoms in North America? *Journal of Abnormal Psychology* 117:300–313, 2008
44. Markus HR, Kitayama S: Culture and the self: Implications for cognition, emotion and motivation. *Psychological Review* 98:224–253, 1991
45. Fitzgenral M, Bellgrove MA: Letter to the editor: The overlap between alexithymia and Asperger's syndrome. *Journal of Autism and Developmental Disorders* 36:573–576, 2006

46. Hill EL, Berthoz S: Response to “letter to the editor: The overlap between alexithymia and Asperger’s syndrome”, Fitzgerald and Bellgrove, *Journal of Autism and Developmental Disorders*, 36(4). *Journal of Autism and Developmental Disorders* 36:1143–1145, 2006
47. Gillberg C: Non-autism Childhood Empathy Disorder. In: Farrow T, Woodruff P (Eds) *Empathy in Mental Illness*. New York, Cambridge University Press, 2007
48. Marchessi C, Bertoni S, Cantoni A, et al.: Is alexithymia a personality trait increasing the risk of depression? A prospective study evaluating alexithymia before, during and after a depressive episode. *Psychological Medicine* 38:1717–1722, 2008

Author Biographies

Po-Fei Chen, BS, MS is a master student at the Department of Psychology at Kaohsiung Medical University in Kaohsiung, Taiwan. She is also a research assistant at both the Department of Psychiatry at Kaohsiung Armed Forces General Hospital in Kaohsiung, Taiwan.

Cheng-Sheng Chen, MD, MS is an assistant professor at Kaohsiung Medical University Chung-Ho Memorial Hospital in Kaohsiung, Taiwan.

Cheng-Chung Chen, MD, PhD is the present of Kai-Suan Psychiatric Hospital in Kaohsiung, Taiwan. He is also an associate professor at Kaohsiung Medical University in Kaohsiung, Taiwan.

For-Wey Lung, ScD, MD is a visiting doctor at the Department of Psychiatry at Kaohsiung Armed Forces General Hospital in Kaohsiung, and the president of Calo Psychiatric Center in Pingtung County. He is also a professor at the Department of Neurology at Kaohsiung Medical University in Kaohsiung, and the Department of Psychiatry at the National Defense Medical University in Taipei, Taiwan.