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Creative Artistic Achievement Is Related to Lower Levels of Alexithymia

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Alexithymia is characterized by deficits in the ability to identify, differentiate, and describe emotions—abilities that are of importance for social interactions, well-being, and, consequently, also for health. The aim of this study was to investigate whether achievements in cultural activities are associated with alexithymia. Participants from the Swedish Twin Registry were 2,279 men and 3,152 women in the ages 27 to 54. Cultural achievement was measured with the Creative Achievement Questionnaire (CAQ) in which participants estimate their achievement in the domains writing, music, visual arts, theater, and dance on a 7-point scale. Alexithymia was measured with the Toronto Alexithymia Score (TAS 20). In sex separated, age, and education-adjusted multivariate analyses, nonpractitioners, amateurs, and professionals in the 5 different CAQ domains were compared with regard to alexithymia scores. For both men and women, achievement in writing and music contributed statistically and independently of one another to a low alexithymia score. In addition, achievement in visual arts contributed independently to low alexithymia score in men and achievement in theatre to low alexithymia score in women. Total creative achievement was calculated as a sum score across domains, and the distribution divided into tertile groups. These groups were compared with regard to alexithymia scores. Large tertile differences were found in both sexes. The results show differences between modalities and cumulative effects of multiple creative achievements.

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INTRODUCTION

To be able to identify, differentiate, and describe emotions (in one's self but also in others), and to have the ability to communicate one's emotions, is of importance for both social interactions and well-being, and consequently also for health. In psychosomatic research, a concept summarizing difficulties in such abilities is *alexithymia*. The term *alexithymia* was coined by Sifneos (Sifneos, 1973, 1996) and has been further developed by several authors (Nemiah, 1996). Alexithymia is a personality construct characterized by deficits in the emotional abilities mentioned previously. Thus, an alexithymic person has

difficulties to identify, distinguish, and describe emotions in himself/herself and in others, which leads to unsuccessful emotional responding. Alexithymics also show poorer communication of emotions, which may lead to inadequate emotional responding from others. Others may think that individuals with alexithymia tend to minimize emotional experience because they focus their attention externally and not on their emotions. They also tend to have reduced capacity for fantasizing and symbolic thinking, abilities that individuals are expected to have.

Neuroimaging studies have shown that alexithymia is related to structural differences in emotional systems of the brain (Borsci et al., 2009; Laricchiuta et al., 2014), as well as to altered patterns of regional brain activity during the processing of emotional stimuli (Deng, Ma, & Tang, 2013; Duan, Dai, Gong, & Chen, 2010; Heinzel et al., 2010), mentalizing (Moriguchi et al., 2006), and imagery (Mantani, Okamoto, Shirao, Okada, & Yamawaki, 2005). There is evidence for a genetic contribution alexithymia (Theorell, Lennartsson, Mosing, & Ullen, 2014), as well as for environmental causes. Alexithymia is associated with several health outcomes, such as depression (Li, Zhang, Guo, & Zhang, 2015), hypertension (Grabe et al., 2010; Jorgensen & Houston, 1986), sympathetic overactivity (Fukunishi, Sei, Morita, & Rahe, 1999), somatic complaints and symptoms (De Gucht & Heiser, 2003), as well as to lower quality of life (Mattila et al., 2010, 2009) and life satisfaction (even after controlling for physical health and depression) (Mattila, Poutanen, Koivisto, Salokangas, & Joukamaa, 2007). The most commonly used instrument for assessing alexithymia is the Toronto Alexithymia Scale (TAS-20) which consists of 20 questions (Bagby, Parker, & Taylor, 1994; Parker, Taylor, & Bagby, 2003). This instrument operationalizes alexithymia not as a distinct clinical diagnosis, but rather as a dimensional personality trait that varies in severity from person to person. The alexithymia scores can, however, be treated both as a continuous variable (degrees of alexithymia) and as a categorical variable (Non-alexithymia: ≤ 51 and Alexithymia: >60). With the latter definition, alexithymia is prevalent in approximately 10% of the general population (Mattila et al., 2009; Salminen, Saarijarvi, Aarela, Toikka, & Kauhanen, 1999). Alexithymia is more prevalent among men than among women and is negatively associated with years of education (Salminen et al., 1999).

There is a discussion on whether alexithymia is a stable personality trait or if alexithymia may be variable, depending on different circumstances. Several studies have shown stability of alexithymia over time in both depressed patients receiving treatment (Luminet, Bagby, & Taylor, 2001; Salminen, Saarijarvi, Aairela, & Tamminen, 1994) and the general population (Tolmunen et al., 2011). On the other hand, other studies have shown that alexithymia may be reduced, such as in a study on depressed patients who received antidepressant medication and/or psychotherapy (Honkalampi, Hintikka, Saarinen, Lehtonen, & Viinamaki, 2000). There are indications that participating in artistic and cultural activities may reduce alexithymia. In a randomized controlled intervention study, women with burnout symptoms were allocated to either participate in different cultural activities such as dance, theatre, drawing, and vocal improvisation during a 3-month period or to belong to a waiting-list control group receiving "usual care" in primary care settings (Grape, Osika, Theorell, & Kowalsk, 2015). Alexithymia scores decreased markedly and significantly in the intervention group during the intervention period and continued to do so during 3 months of follow up; the control group showed stable alexithymia scores during the intervention and follow-up. It is likely that practicing activities such as music, dance, theatre, visual arts, and writing may amplify emotional experiences and facilitate translations of emotions, and thereby reduce alexithymia. Significant relationships between alexithymia and two different aspects of creativity (creative capacity and fantasy proneness) have been described (Fuchs, Kumar, & Porter, 2007; Hoppe & Kyle, 1990). Our own group has studied the relationship between amount of music practice and alexithymia and between dance achievement and alexithymia (Bojner Horwitz, Lennartsson, Theorell, & Ullen, 2015; Theorell et al., 2014), but separate and joint statistical contributions to alexithymia of all the five domains of artistic achievements in one and the same study have not been analysed before.

The aims of this study were to investigate whether there are associations between creative artistic achievements and alexithymia. The first aim was to investigate whether there is an independent association between practicing each one of the creative activities theatre, visual arts, writing, music or dance on one hand, and alexithymia on the other hand. The second aim was to investigate whether there is cumulated statistical value of concomitant creative artistic achievements in relation to alexithymia. The second hypothesis was tested by means of a summation of creative activities. The statistical relationship of this sum score to the TAS 20 score was examined. The rationale behind the second part of our analysis was the idea that different kinds of creative activities may strengthen one another in the statistical protection against alexithymia.

METHOD

Participants

Data were collected as part of a web-survey sent out to a cohort of approximately 32,000 twins born between 1959 and 1985—the Swedish Twin study of Adults: Genes and Environment (STAGE) cohort (Lichtenstein et al., 2002)—from the Swedish Twin Registry, one of the largest registries of its kind (Formann and Piswanger 1979; Lichtenstein et al., 2002; Magnusson et al., 2013). The study was approved by the Regional Ethics Review Board in Stockholm (Dnr 2011/570–31/5, 2011/1425–31, 2012/1107/32). In total, 11,543 individuals participated in the web-survey. Of these, 6,827 individuals (1,396 complete twin pairs and 4,035 single twins without the cotwin) had answered the Creative achievement questionnaire (CAQ, see section Measures). To control for relatedness within the sample, one

twin from each of the 1,396 pairs was randomly selected. These 1,396 individuals and all the 4,035 single twins were included in the present study. Thus the study sample consisted of 5,431 individuals out of whom 2,279 were men and 3,152 were women. The participants were aged between 27 and 54 (mean: 41.0 years, SD: 7.8).

Measures

Alexithymia

A back-translated and psychometrically tested Swedish version of the 20-Item Toronto Alexithymia Scale (TAS-20; Bagby et al., 1994; Parker et al., 2003; Simonsson-Sarnecki et al., 2000) was used to measure alexithymia. TAS-20 is the most commonly used tool for measuring alexithymia in both research and clinical practice. TAS-20 has three subscales: difficulty identifying feelings (DIF; 5 items); difficulty describing feelings (DDF; 7 items); and externally-oriented thinking (EOT), mirroring a tendency to focus attention externally (8 items). The items are rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Five items are negatively keyed and back-transformed when calculating sums. The total alexithymia score is the sum of responses to all 20 items and possible scores range from 20 to 100 with higher scores indicating higher degrees of alexithymia. Cut-offs in TAS-20: scores equal to or less than 51 = *nonalexithymia*, 52 to 60 = *moderate alexithymia*, equal to or greater than 61 = *clinical alexithymia* (Bagby et al., 1994). In this work, we decided to analyse the total scale, accordingly, not the subscales.

Creative artistic achievement: Theatre, visual art, writing, dance, and music

The CAQ was introduced by Carson et al. (2005). Five subscales of the Swedish adaptation of the CAQ of Carson (Theorell et al., 2014) were used to assess achievements in theatre, visual art, writing, dance and music. The two remaining subscales concern achievement in science and innovation and were not used in our analyses. In this questionnaire, achievements in these five artistic areas are self-rated using a 7-graded scale. The questions "How engaged are you in theatre?", "How engaged are you in visual arts?" and so on for each artistic area was answered by choosing one of seven options. For each question/artistic area, response 1 corresponds to no engagement, such as for example "I am not playing theatre at all." Responses 2 to 4 correspond to engagement in different degrees without income from that engagement, such as for example "I am self-taught and dancing, but I have never danced in front of an audience" (2), "I had dance lessons, but I have never danced in front of an audience" (3), "I have participated in public dance show in my place of origin, but I have never been paid for this" (4). Responses 5 to 7 correspond to engagement in different degrees with income from that engagement (i.e., "I have participated in public dance show in my place of origin, and I have been paid for this," 5), "I am a professional dancer" (6), and "I am a professional dancer, and have been reviewed widely by media in Swedish or international specialist journals, and/or have been awarded with at least one prize for my dance" (7). For each artistic area, the subjects have been divided into three groups depending on their answer: nonpractitioners (response 1), amateurs (response 2–4), and professionals (response 5–7). The rationale behind this trichomization was that comparisons between nonactive, amateurs, and professionals are meaningful from a societal point of view, and that the distributions were skewed since there were many subjects who reported no activities.

The CAQ has been shown have good test-retest reliability (.81, Carson et al., 2005) and correlated with other measures of creativity. It has been used by our group (Bojner Horwitz et al., 2015) and Power et al. (2015).

Concomitant artistic achievements. Scores for each CAQ subscale thus range between 1 and 7. Because there might be a cumulative effect of practicing in multiple artistic domains, a total artistic achievement score was calculated as the sum of the raw scores of the five subscales. The participants were divided into three groups as closely as possible to tertiles; 30.7% of the participants (39.3% of the men and 24.6% of the women) did not practice any artistic activities. The middle group constituted 40.3% of the participants (39.1% of the men and 41.2% of the women) and these had sum scores from 6 to 9. The group with the highest scores constituted 28.9% of the participants (21.5% of the men and 34.2% of the women) and their artistic sum scores ranged from 10 to 35. In the multivariate analyses, the tertile division was used (accordingly with range 1–3). The rationales behind this were that the total cumulative score based upon raw CAQ scores was highly skewed and that the analysis should simulate the domain specific comparisons between non-active, amateurs and professionals.

Education

Level of education was assessed by a 10-graded scale reflecting the level of formal school education according to Statistics Sweden. The lowest level was unfinished elementary compulsory school and the highest level an academic doctoral degree. The four lower levels corresponded to no more than high school education (low education) whereas the six upper levels corresponded to at least some exposure to college or university education (high education).

RESULTS

Alexithymia in Relation to Sex, Education, and Age

First, the percentage of men and women who reported that they practiced a creative activity was calculated. The percentages of the male and female practitioners who were amateurs and professionals, respectively, were also

calculated. Age was compared between the nonpractitioners and amateurs and professionals, respectively, using *t*-test. Chi-square test was used to compare the proportions of participants who (a) were men, (b) had high education, and (c) attended cultural activities more than once a year during their childhood/adolescence. These comparisons were made between the nonpractitioners and the amateurs and professionals, respectively. Using *t*-test, alexithymia scores were compared between men and women and between those with higher and those with lower education because it has been reported that alexithymia scores are higher in men and in subjects with low education (Mattila, Salminen, Nummi, & Joukamaa, 2006; Salminen et al., 1999; Theorell et al., 2014). Pearson correlations were computed between age and alexithymia scores in men and women separately.

Women had lower alexithymia scores than men (41.8 and 46.4, respectively; $p < 0.001$). Among the male participants, 22.6% scored moderate alexithymia and 7.8% clinical alexithymia. Among the female participants, the corresponding percentages were 13.2% and 4.4%. Individuals with higher education had lower alexithymia scores than individuals with lower education (45.3 and 48.0 respectively in men, $p < 0.001$; 44.5 and 40.4 respectively in women, $p < 0.001$). Among the individuals with high education, 13.8% scored moderate alexithymia (19.5% in men and 10.3% in women) and 4.2% clinical alexithymia (6.4% in men and 2.8% in women). Among the individuals with low education, 23.0% scored moderate alexithymia (27.1% in men and 19.2% in women) and 8.7% clinical alexithymia (9.8% in men and 7.6% in women). There was a small negative correlation between alexithymia scores and age among the female participants ($r = -0.09$, $p < 0.001$) but the corresponding correlation among men was not significant ($p = 0.77$).

Creative Artistic Achievement Among the Participants

To illustrate the prevalence of engagement in the different artistic areas, percentages of nonpractitioners, amateurs and professionals within each artistic domain were calculated separately in men and women. To investigate the relation between achievement in the different artistic areas and degree of alexithymia, multiple regression analyses were performed with TAS-20 alexithymia score as dependent variable. Degrees of achievement (nonpractitioner, amateur, or professional) in each artistic area were entered as predictors. Age and education were entered as covariates.

Table 1 shows the proportion of nonpractitioners, amateurs, and professionals in the different artistic areas; 30.7% of the participants (39.3% of the men and 24.6% of the women) did not practice any of the artistic activities.

Association Between Creative Achievement and Alexithymia

Figure 1 displays mean alexithymia scores in non-practitioners, amateurs and professionals in writing, visual arts, music, theatre and dance. In all artistic areas—the higher engagement the lower the alexithymia scores.

Independent association between each artistic modality and alexithymia scores

Multiple regression analysis was conducted to investigate whether engagement in the different artistic modalities independently predicted degree of alexithymia (see Table 2). In men, the analysis showed that engagement in writing, visual arts, and music independently predicted alexithymia scores. In women, engagement in writing, music and theatre independently predicted alexithymia scores.

Association between cumulative creative artistic achievement score and alexithymia

To investigate the relationship between concomitant creative artistic achievement and degree of alexithymia, ANCOVA was performed (men and women separately) comparing alexithymia scores in the culturally inactive group with the group with medium cultural activity and the group with high cultural activity (groups based on tertiles described previously). Age was included in the model as a covariate. Thus, the culturally inactive group was entered as the reference group. Finally, we tested in multiple linear regression whether there was interaction between total creativity score and sex in relation to alexithymia score. In other words, we examined whether the statistical relationship between total creative activity and

TABLE 1
Non-practitioners, amateurs and professionals in writing, visual arts, music, theatre and dance among the 2279 men and 3152 women

	Men			*Women*		
	Non-practitioners	*Amateurs*	*Professionals*	*Non- practitioners*	*Amateurs*	*Professionals*
Writing	81.9%	15.5%	2.6%	73.1%	23.8%	3.1%
Visual	81.2%	15.6%	3.2%	64.7%	30.6%	4.7%
Music	62.3%	29.3%	8.4%	53.5%	41.4%	5.1%
Theatre	82.8%	15.4%	1.8%	77.5%	21.0%	1.5%
Dance	73.5%	25.6%	0.9%	53.9%	44.5%	1.6%

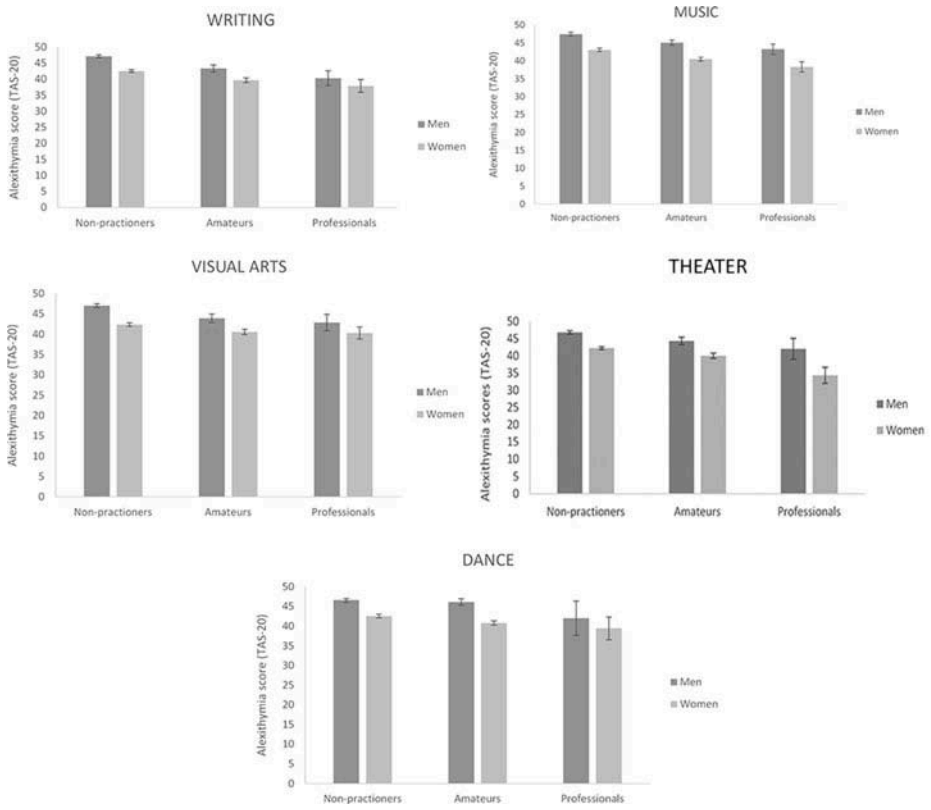

FIGURE 1 Mean (95% CI) alexithymia scores (TAS-20) in men (n = 2279) and women (n = 3152) who are non-practitioners, amateurs or professionals in writing, music, visual arts, theatre and dancing.

alexithymia score differed between men and women. The corresponding tests were also made for all of the creative activities separately using ANCOVA tests.

Many of the participants were practicing, to some extent, more than one of the artistic activities. Alexithymia scores were compared between the group of participants who were not practicing any of the artistic activities (lower tertile: sum score 5), with the middle tertile (sum score 6–9) and the higher tertile (sum score 10–35). The results (see Figure 2) showed that in both men and women, the group with medium and high artistic achievement had lower alexithymia scores than the group without any artistic achievements ($B = -2.02$, $p < 0.001$ and $B = -4.89$, $p < 0.001$, respectively in men and $B = -1.87$, $p < 0.001$ and $B = -4.53$, $p < 0.001$, respectively in women).

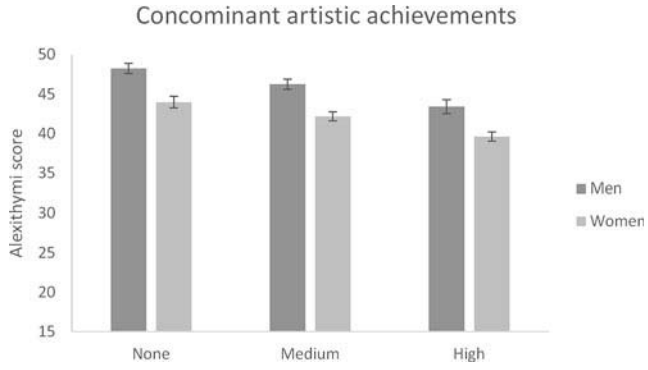

FIGURE 2. Mean (95% CI) alexithymia scores (TAS-20) in three groups of different levels of total artistic achievement (None, Medium, and High) in men (n = 896, 892, and 491, respectively) and women (n = 774, 1299, and 1079, respectively).

DISCUSSION

Our findings showed that, after adjustment for age and education, there were independent negative correlations between artistic achievement in writing and music (men and women), visual arts (men only) and theatre (women only) on one hand and total alexithymia score on the other hand. Dance achievement, however, did not contribute statistically independently to total alexithymia score in men or women. In general, professionals had less alexithymia than amateurs who had less alexithymia than nonpractitioners. In addition, there was a very clear relationship between multiple creative achievement and alexithymia score in men and women—subjects with high total cultural activity had lower alexithymia scores than subjects with medium activity who had lower scores than those with

TABLE 2.
Results of multiple regression analysis investigating the independent predictive ability of creative achievement (non-practitioners, amateur or professional) in theatre, writing, visual arts, dance and music on alexithymia scores while controlling for age and educational level. Men = 2279 and women = 3152

	B	*SEM*	*β*	*t*	*p*
Predictors					
Men					
Age	−0.061	0.027	−0.048	−2.275	0.023
Education	−0.495	0.102	−0.104	−4.864	< 0.000
Theatre	−0.575	0.524	−0.025	−1.096	0.273
Writing	−2.294	0.488	−0.107	−4.699	< 0.000
Visual arts	−1.464	0.451	−0.071	−3.243	0.001
Dance	0.442	0.456	0.021	0.968	0.333
Music	−1.346	0.346	−0.089	−4.015	< 0.000
Women					
Age	−0.175	0.023	−0.133	−7.589	< 0.000
Education	−1.040	0.093	−0.199	−11.146	< 0.000
Theatre	−0.948	0.424	−0.043	−2.235	0.025
Writing	−1.506	0.370	−0.077	−4.068	< 0.000
Visual arts	−0.449	0.321	−0.025	−1.398	0.162
Dance	−0.438	0.358	−0.023	−1.222	0.222
Music	−1.327	0.328	−0.077	−4.041	< 0.000

low activity (inactive). Professional artists constitute a small group in society (in this study between 1 and 7% depending on kind of activity) and hence the most important comparisons quantitatively from a public health perspective are those between nonpractitioners and amateurs. The difference in mean score for each one of the artistic achievement comparisons (writing, theatre, music, dance, visual) between nonpractitioners and amateurs is in the order of 2 points (with comparisons separately for men and women), whereas in the comparison between the lowest tertile group (no artistic achievements) and the highest tertile (concomitant artistic achievement) the difference is in the order of 5 points on the alexithymia scale. This speaks in favor of the assumption that there is an added statistical effect of multiple creative activities in relation to alexithymia. It should be pointed out that, on a composite scale of the kind that we have used in the total creativity analysis, it is not possible to disentangle among subjects with high activity (scoring at least 10) those with one or a couple of well-developed specialties (in the most extreme case 6 + 1 + 1 + 1 + 1) from those with small activity in several activities (in the most extreme case 2 + 2 + 2 + 2 + 2). But in the former group there were 37 participants (2.4% of participants scoring at least 10 points), and in the latter group there were correspondingly 5 participants (0.3%). Accordingly, in the upper tertile with participants scoring at least 10 points there were very few subjects who reported the lowest amateur activity for all the studied creative activities. The vast majority reported that they had taken lessons but not gone public (level 3) at least in a couple of activities. With increasing total scores the proportion of professionally active increases.

In this study, the focus was on the independent relation of each activity, as well as the joint effect of concomitant creative artistic achievement. In the aforementioned studies and our study, the study design does not allow us to make any causal inferences. Accordingly, we do not know whether subjects with good emotional capacity choose to participate in creative activities or whether the findings reflect an effect on emotional capacity of creative activities. However, in our previous study (Theorell et al., 2014) we found that genetic pleiotropies were involved in the relation between music practice and alexithymia, suggesting that common genetic influences could be one explanation also for the associations found here. To address causal mechanisms, controlled evaluations of interventions are essential and, as far as we know, the study by our group (Grape et al., 2015) is the only one that has tested the possible effect of a multimodal cultural intervention on total alexithymia scores. However, one should note that that study, the results of which do speak in favor of the view that alexithymia scores can be beneficially affected by such an intervention was made on female outpatients with burnout symptoms—a more clinical population than we have studied in this examination. Practicing activities such as music, dance, theatre, writing, and visual arts may amplify emotional experiences and facilitate translations of emotions, and thus thereby reduce alexithymia.

The use of the self-administered TAS-20 builds upon the subjects' ability to adequately respond to the questions regarding ability to identify emotional states, to give words to them and to act accordingly. Such emotional insight (and ability to fill in the questionnaire adequately) may be gained mainly from people whom the subject interacts with. One may be told by others that one lacks emotional insight. Regardless of which ability the subject has in his/her way of describing this, capacity to deal with emotions may in itself arise in social interaction. It is, therefore, possible that a self-administered questionnaire of the type that TAS-20 may not capture all aspects of alexithymia. This could lead both to underestimation and overestimation of the true association.

Regarding the reliability of the TAS20, comparisons with a more objective interview-based method are needed. Using the structured interview for alexithymia, Caretti et al. (2011) made such a comparison in Italian samples, and acceptable correspondence was found between the TAS20 and the interview-based ratings (Grabe et al., 2010). Goucht and Heiser (2003) examined the stability and validity of the three subscales of TAS-20 in clinical and nonclinical participants in France and showed that the three-factor structure of TAS-20 was confirmed across five samples. A study of almost 600 Iranian undergraduate students also confirmed the three-factor structure (Besharat, 2007). In addition, Säkkinen et al. (2007) confirmed the three-factor structure

in a study of normal adolescents in Finland. Kooiman, Spinhoven, and Trijsburg (2002) have criticized the psychometric properties of TAS-20 but it seems that more problems arise in the use of TAS-20 in clinical samples (such as patients who somatize and psychiatric patients) than in nonclinical samples (as in our study). Our conclusion from the literature is that TAS-20 can be used in normal populations and that there is acceptable correspondence with standardized interview.

Regarding the representativeness of the sample, it could be mentioned that in our study, which was originally meant to explore musical engagement, we expected to have a slight overrepresentation of music-interested individuals in the sample. Apart from that we are confident that our sample represents the Swedish population in the age group 27–54.

Although the cross-sectional study design limits our possibility to draw any conclusions about causality, it is plausible that several causal mechanisms are involved in the relationships uncovered in this research. Constitutional factors could simultaneously influence both alexithymia and engagement in artistic activities (Theorell et al., 2014), but it is also possible that participating in activities such as writing, music, theatre, and visual arts could reduce alexithymia.

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