Mapping facets of alexithymia to executive dysfunction in daily life

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**A R T I C L E  I N F O**

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**A B S T R A C T**

Alexithymia refers to a cluster of emotion processing weaknesses. Etiological theories suggest frontal lobe impairment, which implicates corresponding executive dysfunction. Although some studies have identified cognitive deficits in alexithymia, no study has systematically investigated executive functioning in this population while simultaneously deconstructing alexithymia and related constructs into empirically-derived dimensions. In this study, 104 adults completed self-report measures of alexithymia, emotional intelligence, and mood awareness as well as an ecologically-sensitive measure of discrete executive functions in daily life. Principal components analysis revealed two latent alexithymia factors: emotional clarity (EC) and emotional monitoring (EM). Analyses revealed that low-EC participants performed worse than high-EC participants across multiple executive function domains, including behavioral initiation/inhibition, set-shifting, self-monitoring, working memory, error recognition, and ability to plan and organize. No relationship was found between EM and patterns of cognitive performance. These data highlight the need to decompose alexithymia into discrete facets and suggest that executive dysfunction is related to lack of emotional clarity specifically rather than alexithymia broadly.

1. Introduction

Emotional regulation and the impact of dysfunctional emotional systems on one’s mental and physical health have been of recent interest among researchers. Alexithymia, a personality construct first defined by Sifneos (1973), is used to classify those who have difficulty perceiving and processing emotions. Salient characteristics that define the alexithymic population include difficulty identifying feelings and distinguishing among bodily sensations of arousal, difficulty describing feelings to others, constricted imaginal processes, and a stimulus-bound, externally orientated cognitive style (see Luminet, Bagby, Wagner, Taylor, & Parker, 1999 for a discussion of how alexithymia relates to the Five-Factor Model of personality). With 10% of the general population estimated to be alexithymic (Fukunishi, Berger, Wogan, & Kuboki, 1999; Taylor, Bagby, & Parker, 1997), researchers are finding vulnerability for a variety of somatic syndromes such as hypertension, diabetes, chronic pain, and obesity (Kauhanen, Kaplan, Cohen, Julkunen, & Salonen, 1996) as well as psychiatric disorders (Luminet & Rimé, 2004; Taylor et al., 1997) in alexithymic individuals.

Past research employing neuroscientific techniques has implicated frontal lobe dysfunction in the alexithymia trait. Human brain lesion studies indicate a decrease in emotional expressivity after frontal lobe damage, with more recent neuroimaging studies suggesting particular roles of the anterior cingulate (Lane et al., 1998) and prefrontal cortices (Bermond, Vorst, & Moormann, 2006). Although a model of frontal lobe brain functioning in alexithymia is emerging, it is problematic that most studies to date have largely ignored the cognitive deficits concomitant with frontal lobe dysfunction. Cognitive functions of the frontal lobe, the so-called executive functions, include cognitive flexibility, decision making, inhibitory control, planning and organization, self-monitoring, abstract reasoning, sustained and selective attention, and working memory (for review, see Roth, Randolph, Koven, & Isquith, 2006). While some studies reveal neuropsychological indices of executive dysfunction in conjunction with alexithymia in specific clinical populations, such as individuals with traumatic brain injury (Henry, Phillips, Crawford, Theodorou, & Summers, 2006), human immunodeficiency virus (Bogdanova, Díaz-Santos, & Cronin-Golomb, 2010), Parkinson’s disease (Costa, Peppe, Carlesimo, Salamone, & Caltragione, 2007), and heroin addiction (Huang, Zhu, Yao, & Zhou, 2005), very few studies have investigated patterns of cognitive functioning and alexithymia in non-clinical samples. One such study by Xiong-Zhao, Xiao-Yan, and Ying (2006) reported that level of alexithymia was negatively correlated with performance on the Wisconsin Card Sorting Test (WCST).

While these data certainly suggest some executive dysfunction in alexithymia, neuropsychological measures such as the WCST index multiple executive functions simultaneously. It remains unclear which specific aspects of executive function are implicated in alexithymia and whether any performance-based neuropsychological deficits translate beyond the laboratory to self-reported real-life cognitive difficulties. Clinical assessment of executive...
functions has historically been challenging because of their dy-
namic nature (Stuss & Alexander, 2000). The structured format of
the typical assessment context may not place sufficiently high
demands on executive functioning (Holmes-Bernstein & Waber,
1990) such that adults may score within normal limits on perform-
bance-based measures despite reports of severe executive dys-
function in everyday life (Eslinger & Damasio, 1985; Goldstein,
Bernard, Fenwick, Burgess, & McNeil, 1993; Meyers, Berman, Schei-
bel, & Hayman, 1992). Since current performance-based tests are
constructed to assess individual components of executive
functions over short periods of time, they may fail to capture the
integrated, multidimensional, relativistic, priority-based decision-
making that is demanded in real world situations (Goldberg &

Using our current knowledge of neuropsychological correlates
of executive functioning, further research is needed to explore
executive functioning in alexithymic individuals in non-clinical
samples. However, the multidimensionality of the alexithymia
construct can make data interpretation complicated, and it has
been noted that there is considerable overlap of alexithymia with
the related constructs of emotional intelligence and mood aware-
ness (Coffey, Berenbaum, & Kerns, 2003). Indeed, past factor ana-
lytic research has suggested that different facets of alexithymia
have unique cognitive and emotion processing correlates (Coffey
et al., 2003). However, no study to date has examined the relations-
ships between specific facets of alexithymia and patterns of every-
day executive functioning. To address this gap, this study uses
empirically-derived facets of alexithymia and an ecologically-sen-
sitive, broadband measure of executive dysfunction in a non-cli-
cal sample of young adults. Given the finding by Xiong-Zhao
and colleagues (2006) of diminished performance by alexithymic
individuals on the WCST, it is expected that individuals who score
higher on dimensions of alexithymia will report difficulty in daily
life with executive functions needed for this task, including set-
shifting, behavioral inhibition, error monitoring, and working
memory.

2. Method

2.1. Participants

One hundred nineteen unselected, right-handed undergraduate
students (71 women) at a liberal arts college participated in the
study for partial course credit. Written informed consent was ob-
tained per participant, and the experimental protocol was ap-
proved by the local Institutional Review Board. Rule-out criteria
for participation included English as a second language (n = 2),
presence of a diagnosed psychiatric illness and/or history of psy-
chiatric treatment (n = 11), history of significant neurological ill-
ness or brain injury (n = 1), and elevated negativity scores on the
Behavior Rating Inventory of Executive Functions-Adult Version
(n = 1). Considering the above exclusion criteria, valid data for
104 valid participants (64 women) with a mean age of
19.6 ± 1.4 years and mean education of 13.3 ± 1.3 years were avail-
able for statistical analysis.

2.2. Procedure

Participants were asked to complete self-report questionnaires
designed to assess alexithymia and executive functioning. Alexi-
thyria-related surveys included the Toronto Alexithymia Scale
(TAS-20; Taylor et al., 1997), the Trait Meta-Mood Scale (TMMS;
Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), and the Mood
Awareness Scale (MAS; Swinkles & Giuliano, 1995). Participants
also completed the Behavior Rating Inventory of Executive
Function-Adult Version (BRIEF-A; Roth, Isquith, & Gioia, 2005), to
obtain a comprehensive self-assessment of executive functioning.

2.3. Measures

The TAS-20 is a 20-item scale that consists of three subscales:
Difficulty Identifying Feelings (e.g., “I am often confused about
what emotion I am feeling”), Difficulty Describing Feelings (e.g.,
“I am able to describe my feelings easily”), and Concrete Thinking
(e.g., “I find examinations of my feelings useful in solving personal
problems”). Each factor has shown adequate internal consistency,
with alpha coefficients of .78, .75, and .66, respectively. Test–retest
reliability for the full scale is .77 (Bagby, Taylor, & Parker, 1994).
Although some have argued that the TAS-20 assesses a general
psychological distress factor (Leising, Grande, & Faber, 2009), addi-
tional research indicates that the TAS-20 captures an individual
difference in emotional experience and behavior that corresponds
to a complex combination of personality traits (Luminet et al.,
1999).

The TMMS is a 30-item scale that consists of three subscales:
Attention to Feelings (e.g., “I pay a lot of attention to how I feel”),
Clarity of Feelings (e.g., “I am usually very clear about my feel-
ings”), and Mood Repair (e.g., “When I become upset, I remind my-
self of all the pleasures in life”). The TMMS has shown adequate
internal consistency (full scale alpha coefficient = .82), and internal
reliabilities (.86, .87, and .82, respectively) (Salovey et al., 1995).
The MAS is a 10-item scale that consists of two subscales: Mood
Monitoring (e.g., “I find myself thinking about my mood during the
day”) and Mood Labeling (e.g., “Right now I know what kind of
mood I’m in”). Both the Mood Monitoring and Mood Labeling sub-
scapes have respectively shown adequate internal consistency (.88
and .77) and test–retest reliability (.94 and .76) (Harris, 2000).
The BRIEF-A was designed to assess the broader, molar aspects
of complex problem-solving demands (Roth et al., 2005). Its 75
items comprise nine subscales that measure everyday behavioral
manifestations of executive functioning including Inhibition (e.g.,
“I make decisions that get me into trouble”), Set-shifting (e.g., “I
am disturbed by unexpected changes in routine”), Emotional Con-
trol (e.g., “I have emotional outbursts for little reason”), Self-mon-
itoring (e.g., “I notice when I cause others to feel bad”), Task
Initiation (e.g., “I have trouble getting started on tasks”), Working
Memory (e.g., “I have trouble with tasks that involve more than
one step”), Planning/Organization (e.g., “I plan ahead for future
activities”), Task Monitoring (e.g., “I make careless errors when
completing tasks”), and Organization of Materials (e.g., “I lose
things”). Subscale data are standardized to produce T-scores
according to age and gender norms (Roth et al., 2005). In addition
to serving as a broadband index of executive functioning, the
BRIEF-A is known for its ecological validity (Vriezen & Piggot,
2002) and verisimilitude between test items and daily, real-life
pressures (Taylor, 2004).

3. Results

3.1. Principal component analysis of alexithymia measures

Given lack of consensus in the literature regarding the number
and nature of alexithymia dimensions, principal component analy-
sis (PCA) was performed to identify the latent factors among the
TAS-20, TMMS, and MAS subscales. The number of factors retained
was determined by visual inspection of the scree plot. After Vari-
max rotation, two factors emerged, which together accounted for
67.4% of the total variance. Based on the pattern of salient loadings
(Table 1), the first factor was renamed Emotional Clarity (EC), and
the second factor was renamed emotional monitoring (EM). Repeat
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