Sex-typical symptoms of depression and the importance of conditioning contexts in Austria

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Abstract

Background: Findings regarding the effect of sex on depression are inconclusive. The aim of this paper is to contribute to clarification concerning this effect by first disentangle the concept of depression and splitting it up into two sub-types. Second, we will address macro-level contexts as conditions of the sex-effect on depression.

Methods: This study gives a comparative analysis of sex as a predictor of depression symptoms in various Austrian federal states. It offers a secondary data analysis of data collected from an online survey (CAWI) conducted in Austria as a quota sample of Austrian inhabitants (N=1229). Besides sex as a predictor of depression symptoms (measured by PHQ-9 items) we also consider four dimensions of social support, the retirement status, and the experience of a vocational gratification crisis.

Results: By and large, sex is not associated with motivational deficit symptoms, but rather with somatic stress symptoms. Taking into account federal states as conditions, the sex-effect on depression symptoms turn out to be context-dependent.

Limitations: Using some items from the PHQ-9 inventory for measuring depression symptoms was arbitrary, findings could be sensitive to operationalization. Furthermore, Austrian federal states are no substantial variables which could condition the sex-effect directly. The actual conditioning variables correlate with the Austrian federal states, but remain unobserved here.

Conclusions.: Depression symptoms are partly sex-typical, but this association is context-dependent. For diagnostics, therefore, the recommendation arises to take symptomatic sub-types of depression into account, instead of an in itself heterogeneous construct that expresses itself differently under certain conditions.

Keywords

Sex differences, depression symptoms, psychiatric disorders, Austrian federal states

Introduction

This paper will discuss the effect of sex on depression against the background of inconclusive findings on this. Although most studies on that topic conclude that females are more prone to depression than males, a couple of other studies (e.g. González-Tejra et al., 2005; Schmidl, 2014) failed to prove this sex-effect or report inconclusive results. Our aim is to contribute to clarification regarding the sex-effect on depression in two stages. First, we disentangle depression by splitting it up into two types of symptoms, motivational deficit symptoms and somatic symptoms, and then analyse the effect of sex on these symptoms separately. Our presumption is that symptom types are affected differently by sex. Second, we will address the question whether the sex-effect on symptoms of depression is conditioned by macro-level contexts.

One problem to which the inconclusive findings regarding the effect of sex on depression points, is misdiagnosis. Especially if depression is taken as an undifferentiated construct, there is some evidence that it is underdiagnosed for men (Möller-Leimkühler, 2008; Rutz, 2010; Rutz et al., 1997). At the same time, the risk of a suicide attempt increases if a depression goes untreated because of being undiagnosed (see e.g. Rihmer et al., 1990; Rihmer, 1996). As a consequence, the "gender paradox" of depression and suicide arises: on the one hand, the proportion of diagnosed depression among women doubles that for men (cf. Kessler et al., 1994; Kessler et al., 1995; Weissman et al., 1996). On the other hand, the suicide rate for men is more than twice as high as it is for women (Möller-Leimkühler, 2008).

Given this scenario, which suggests that certain male-specific symptoms of depression may increase the risk of its misdiagnosis among men, researchers (cf. Marcus et al., 2008; Silverstein, 1999) have recommended that a symptom-based approach be used to study, diagnose and treat the disease. This would allow for a more precise diagnosis and a more differentiated understanding of the risk factors behind it than a standard concept-based approach—one that treats depression exclusively in terms of the complex, often multidimensional, but also diagnostically undifferentiated *concepts* associated with it—can provide (Roca et al., 2013; Caldieraro et al. 2013). This paper determines two symptom subtypes of depression: one associated with a pronounced motivational deficit (type I symptom subtype), and one characterised by psychosomatic stress symptoms (type II symptom subtype) (cf. Kapfhammer, 2006; Silverstein, 1999; Silverstein et al., 2013).

In general, it can be said that permanent stress—or rather, maladaptive stress response—gives rise to affective disorders, especially depression (Kessler, 1997; World Health Organization, 2001). Which external circumstances stress an individual, and to what degree they do, however, is partly determined by that person's neuro- and biochemical reaction to potential stressors. This reaction, in turn, is moderated by biological sex (Bangasser & Valentino, 2014; Taylor et al., 2000; Bale & Epperson, 2015; Goldfarb et al., 2019; Seo et al., 2011). Given the complex interdependence of external circumstance and an individual's neurological/biological response, it is thus clear that sex can influence whether and to what extent external circumstances represent risk factors for a depression (cf. Nolen-Hoeksema et al., 1999; Cyranowski et al., 2000). Assuming the existence of sex-typical symptoms of depression (Altemus et al., 2014; Crockett et al.,

2020; Möller-Leimkühler, 2005, 2008), we hypothesize that sex can also predict the intensity of depression symptoms (hypothesis 1).

We also take into account other factors that researchers suggest may influence the onset of depression, including the dimensions of social support (e.g. Gnulka et al., 2019; Kim et al., 2008; Sarason et al., 2001), the experience of an occupational gratification crisis (e.g. Schmidl 2014; Rödel et al., 2004; Siegrist et al., 2004), and the retirement-status (Nishimura et al., 2018; Topa & Valero, 2017). In theory, social support is inversely related to depression because it is a coping-resource that panders the positive impact of stress on depression (Tsai et al., 2019; Vaculíková & Soukup, 2019; Woods et al., 2019). An occupational gratification crisis indicates a work-related effort-reward imbalance, which is a stressor well known to have adverse effects on health, especially as a trigger for depression (Barrech et al., 2017; Rugulies et al., 2017; Wege et al., 2018). There is quite a bulk of trajectories connecting retirement to depression. For most individuals, the shift to retirement means a discontinuity in terms of financial resources, social relationships, daily routines etc. However, such a disruptive change in life course promotes stress and therefore depression (Lennox & Carr, 2020; Segel-Karpas et al., 2018).

Furthermore, social, political, economic, cultural, historical and geographical contextual factors all condition how stressors affect the likelihood and prevalence of depression in a specific population (Brailovskaia et al., 2018; Baxter et al., 2021). Given that some conditions vary across Austrian states (Statistik Austria, 2019), we test the assumption that those states are relevant contexts that condition how certain predictors (sex, social support, gratification crisis) affect the symptoms of depression (hypothesis 2).

For Austria, the European Health Interview Survey (EHIS) revealed a depressive symptoms prevalence of 4.3 percent (men: 3.4 %, women: 5.1 %), which is lower than the mean prevalence in the EU (6.6 %) (Hapke et al., 2019). Comparing the nine federal states, there are some varying conditions on the macrolevel: for example, the Human Development Index HDI (Burgenland: 0.869, Vienna: 0.936; Global Data Lab, 2018), political orientation (center-left: i.e. Burgenland and Vienna, center-right: i.e. Tirol and Salzburg; Parlamentsdirektion Republik Österreich, 2020), population density (Carinthia: 59/km², Wien: 4607/km²; Statistik Austria, 2020), and proportion of immigrants (Burgenland: 12.2%, Wien: 45.9%; Statistik Austria, 2020). Finally, the prevalence of self-reported depression ranges from 5.6% in Vorarlberg to 11% in Vienna (Klimont & Baldaszi, 2015).

Data and methods

Data

This study uses data collected by Schmidl (2014) from an online survey (CAWI) conducted in Austria to investigate gender risk factors for depression (GRD). Period of data collection was from April 4 to May 21, 2014. Sampling is based on a quota selection of the people residing in Austria at the time of the survey. The quota was based on sex (equal distribution) and the socio-demographic characteristics of age, state of residence and school education (each based on population-oriented distribution) (Schmidl, 2014). The sample includes n=1229 people.

Schmidl (2014) recommends weighing the data, but there are no available case weights for GRD. To remedy this, we constructed normalized weights and then used them to adjust our sample to the sex, age, and federal state distribution of the population (weighting efficiency WE=0.9286). In accordance with Schmidl's suggestion, we also restricted our sample to persons aged 18 to 69 (Schmidl, 2014).

Table 1 shows the descriptive statistics of demographic variables for the data of the weighted and age-delimited sample for all Austrian federal states.

Table 1. Descriptive statistics of demographic variables by state

	W	N	B	St	K	O	S	T	V
N	258	235	37	175	78	206	73	102	49
Age, Years	42.54	43.85	45.81	43.54	44.23	43.64	42.55	41.78	44.23
<i>M (SD)</i>	(13.6)	(14.1)	(13.1)	(14.1)	(14.3)	(14.0)	(13.1)	(13.4)	(13.3)
Sex	134	117	19	87	38	103	39	49	26
(% female)	(52.1)	(49.7)	(50.6)	(49.6)	(49.0)	(50.1)	(53.6)	(48.1)	(52.9)

Note. Abbreviations of federal states: W=Vienna, N=Lower Austria, B=Burgenland, St=Styria, K=Carinthia, O=Upper Austria, S=Salzburg, T=Tyrol, V=Vorarlberg; *M*=mean, *SD*=standard deviation.

Operationalization

Symptoms of depression are operationalised through four items in the Patient Health Questionnaire (PHQ-9; Löwe et al., 2002; Kroenke et al., 2001). This inventory asks subjects to use a 4-step response scale to assess, for nine items, how frequently they have experienced symptoms of depression. The question for all PHQ items was worded as follows: "Over the last 2 weeks, how often have you been bothered by any of the following problems?" The response scale was: 0=*Not at all*; 1=*Several days*; 2=*More*

than half the days; 3=Nearly every day. The four items (symptoms) used for this study were (1) “Little interest or pleasure in doing things,” (2) “Feeling down, depressed, or hopeless,” (3) “Trouble falling or staying asleep, or sleeping too much,” and (4) “Feeling tired or having little energy.” Items 1 and 2 measure the symptom subtype I, while items 3 and 4 measure symptom subtype II. A sum score was computed for the subject’s total answers to all items.

Social support was measured using the Berlin Social Support Scales (BSSS; Schulz & Schwarzer, 2003). The original dataset already contained BSSS scores for the domains of received social support, perceived social support, need for social support, and the search for social support.

The extent of a vocational gratification crisis was also determined as a score (Schmidl, 2014), based on the indicators of the Effort-Reward-Imbalance Questionnaire (ERI-S; Rödel et al., 2004; Siegrist et al., 2004).

Statistical analyses

First, descriptive statistics were calculated for the symptom subtype scores, scales of social support, the gratification crisis scores, sex, and the retirement status (whether or not retired). The proportion of retired people in our sample appeared too large to be excluded from our analysis, even though the vocational gratification crisis has only been measured for working people. We carried out a skewness-reducing transformation and z-standardization on score variables of symptom subtypes and social support. The score variable of the gratification crisis was centred only on the arithmetic mean of the sample.

To assess the link between sex and symptom subtypes, we conducted bivariate linear regressions and the Kolmogorov Smirnov test. Next, we calculated multiple two-level regressions using the scores for the subject's degree of social support, retirement status, experience of gratification crisis, and sex as independent variables and the scores for each symptom subtype as dependent variables. Federal states were considered at the second (context) level.

Results

Descriptive analyses

Table 2 provides descriptive statistics for detecting the distribution of all metric variables (scores) and transformed counterparts. Here, the extreme skewness of the score for “perceived social support” is striking: on average, it was relatively high. Using the transformation, however, we lessened the sensitivity of the analysis to the already-sparse values for this variable in the lower value spectrum and paid more attention to the high end of the scale.

Cronbach alpha for social support scales, the vocational gratification crisis score, and the score for subtype I are at least acceptable ($\alpha > 0.7$). For subtype II symptoms alpha is slightly low, but not so low that it would indicate a rejection of the combination of items (Cho & Kim, 2015). Regarding internal consistency, we consider the used scales to be reliable.

612 respondents (50.5 percent) are female, 228 (18.8 percent) are retired.

Table 2. Descriptive statistics of scores (symptom subtypes, social support, gratification crisis) reliability and transformation of the scales

	q	M (SD)	Min	Max	Skewness	α (k)
Symptom subtype scores						
Type I		1.6 (1.5)	0	6	0.97	0.76 (2)
transf.	0.0625	0 (1)	-1.34	2.05	-0.04	
Type II		2.2 (1.6)	0	6	0.63	0.67 (2)
transf.	0.375	0 (1)	-1.74	1.96	-0.03	
Social support scores						
received		43.0 (10.9)	9	60	-0.32	0.87 (15)
transf.	1.625	0 (1)	-2.15	1.75	0.05	
perceived		27.9 (4.8)	8	32	-1.41	0.94 (8)
transf.	6.5	0 (1)	-1.35	1.18	0.00	
need		10.5 (2.6)	4	16	-0.13	0.71 (4)
transf.	1.25	0 (1)	-2.23	2.29	0.09	
search		13.6 (3.4)	5	20	-0.10	0.84 (5)
transf.	1.125	0 (1)	-2.36	1.95	0.02	
Vocational gratification crises scores (centered)		0 (7.5)	-20.64	23.36	0.25	0.85 (16)

Note. M =mean, SD =standard deviation, Min =minimum, Max =maximum, α =Cronbach's α , k =number of items; Transformation of a variable $X \rightarrow X_t$: $X_p = (X+1)^q$, $X_t = (X_p - M_{X_p}) / SD_{X_p}$.

Bivariate analysis sex and symptoms

We found no significant association between sex and the subtype I symptoms (motivational deficit). Yet, the prevalence of the subtype II symptoms (psychosomatic stress symptoms) was clearly influenced by sex, with women being more affected than men (Table 3).

Table 3. Bivariate analysis of the connection between symptom subtypes and sex

	OLS (independent variable: female)		KS (male vs. female)
	<i>b</i>	<i>r</i>	<i>p</i>
Symptom subtype I (Motivational deficit)	0.02	0.01	0.62
Symptom subtype II (psychosom. affected)	0.23 ***	0.12	0.02

Note. Linear regression (OLS): *b*=regression coefficient, *r*=effect strength; Kolmogorov Smirnov test for distribution differences (KS): *p*=probability of error.

****p*<0.001.

Regression analyses

We calculated a multiple two-level regression to control for the effect of further stressors and the conditioning influence of context. Within-state effects (those within the federal states) were analysed (bootstrapped), taking into account the scale limits of symptom subtypes as dependent variables (Table 4).

Symptom subtype I (motivational deficit) was clearly associated with the risk factors “perception of social support,” “need for social support,” “not retired,” and “vocational gratification crisis.” The greater the perception of social support, the lower the motivational deficit. The opposite was true for the need for social support: the greater the need, the stronger the motivational deficit. In the case of pensioners, the subtype I symptoms were comparatively less pronounced; for the non-pensioners group, the motivational deficit rose as the intensity of the vocational gratification crisis increased. The effects of seeking social support and perceived social support are also statistically significant, but negligible in terms of magnitude. The person’s sex does not sufficiently

explain the symptom subtype I. But the federal states have a conditioning influence on the dependent variable or on the effects of the independent variables.

As with the type I symptoms, those for type II (psychosomatic stress) are dependent on the risk factors “perception of social support” (negative), “need for social support” (positive), and “vocational gratification crisis” (positive). The variables “received social support,” “search for social support,” and “retirement status” had no statistically significant effect on the symptoms of psychosomatic strain, or an effect which was statistically significant, but nevertheless too weak for a sensible interpretation. One particularly significant difference between symptom subtypes I and II as dependent variables is that sex is a relevant predictor in the subtype II symptoms. However, the strength and direction of this “sex effect” varies by federal state: deviation from the weak positive average effect (the intensity of the corresponding symptoms is stronger in women than in men) on type II-symptoms is particularly noticeable in Salzburg and Vienna (Table 6). While in Salzburg the psychosomatic stress symptoms—all other independent variables being equal—affects men more than women, the reverse result is particularly strong in Vienna. *Ceteris paribus*, women in Vienna are significantly more likely to express subtype II symptoms than men.

Looking at type I-symptoms, the overall non-existing effect of sex appears to be the result of lumping together the contrary state-specific effects of sex. The differential analysis of the sex effect on type I symptoms among the Austrian federal states (Table 5) indicates a strong negative sex effect in Vorarlberg and Salzburg, in sum compensated by strong positive effect in Carinthia and Burgenland.

Table 4. Multiple two-level regression with the scores of social support scales, retirement, vocational gratification crisis, and sex as independent variables and the symptom subtype I and subtype II as dependent variables

	<i>pseudo-R²</i>	<i>Average effects within the federal states</i>			<i>Effect differences between the federal states (m=9)</i>		
		<i>b</i>	<i>95% CI</i>	β	<i>v</i>	<i>90% CI</i>	
Symptom subtype I (N=927)	0.29						
Received social support		0.06 *	[-0.00, 0.12]	0.06	0.13 ***	[0.08, 0.18]	
Perceived social support		-0.28 ***	[-0.35, -0.21]	-0.26	0.15 ***	[0.10, 0.20]	
Need for social support		0.20 ***	[0.13, 0.27]	0.19	0.12 ***	[0.06, 0.17]	
Search for social support		-0.07 *	[-0.15, 0.00]	-0.06	0.14 ***	[0.09, 0.19]	
Not Pensioner		0.22 ***	[0.08, 0.35]	0.10	0.14 ***	[0.09, 0.19]	
Vocational gratification crisis (not pensioner)		0.05 ***	[0.04, 0.05]	0.32	0.11 ***	[0.06, 0.17]	
female		0.04	[-0.07, 0.14]	0.02	0.16 ***	[0.11, 0.21]	
Symptom subtype II (N=936)	0.23						
Received social support		0.05	[-0.02, 0.11]	0.05	0.08 *	[0.03, 0.14]	
Perceived social support		-0.26 ***	[-0.33, -0.20]	-0.24	0.14 ***	[0.08, 0.19]	
Need for social support		0.12 *	[0.04, 0.19]	0.10	0.11 ***	[0.05, 0.16]	
Search for social support		-0.06	[-0.14, 0.03]	-0.04	0.13 ***	[0.08, 0.18]	
Not Pensioner		0.14 *	[-0.00, 0.28]	0.06	0.11 ***	[0.06, 0.16]	
Vocational gratification crisis (not pensioner)		0.04 ***	[0.03, 0.05]	0.27	0.07 *	[0.01, 0.12]	
female		0.27 ***	[0.15, 0.39]	0.15	0.09 *	[0.04, 0.14]	

Note. Multiple two-level regression (MLE): *b*=average regression coefficient (within effects), β =standardized regression coefficient, *v*=strength of effect conditioning; *CI*=confidence interval (bootstrapping: *N*=10000).

p*<0.05; **p*<0.001.

Table 5. Differential analysis of the sex effect on type I symptoms among the Austrian federal states

	<i>Effect female in federal state</i>		<i>Deviation from the average effect</i>	
	<i>b</i>	<i>95% CI</i>	<i>u</i>	<i>r</i>
Vorarlberg	-0.47	[-0.57, -0.36]	-0.50	-0.82 ***
Tirol	0.09	[-0.01, 0.20]	0.06	0.12
Salzburg	-0.32	[-0.43, -0.21]	-0.36	-0.64 ***
Upper Austria	0.11	[-0.00, 0.21]	0.07	0.10
Carinthia	0.32	[0.21, 0.42]	0.28	0.56 ***
Styria	0.05	[-0.05, 0.16]	0.02	0.03
Burgenland	0.55	[0.44, 0.66]	0.51	0.86 ***
Lower Austria	-0.06	[-0.17, 0.05]	-0.09	-0.13 *
Vienna	0.15	[0.04, 0.26]	0.11	0.15 *

Note. Multiple two-level regression (MLE): *b*=regression coefficient sex (female) per federal state, *u*=deviation from the average regression coefficient (within effect) across all federal states, *r*=standardized strength of the sex effect per state; *CI*=confidence interval (bootstrapping: *N*=10000).

p*<0.05; *p*<0.01; ****p*<0.001.

Discussion

This study investigates how risk factors influence the expression of certain symptom subtypes of depression, focusing on sex as a predictor of symptom expression. In other words, it seeks to determine whether the symptom subtypes examined here are typical for either sex. We also asked whether the effect of predictors may be conditioned by specific contexts. Our results showed no association between sex and the “motivational deficit” symptoms (subtype I), but a clear association between sex and the “psychosomatic stress” (subtype II) symptoms. The “psychosomatic stress” (subtype II) symptoms, we found, affected women more deeply than men. These results only partially refute hypothesis 1 (sex predict the intensity of depression

symptoms), showing it to be false only for symptom subtype I. In contrast, our results confirm hypothesis 1 for symptom subtype II. This result echoes those of Silverstein (1999) and Silverstein et al. (2013), who found no difference in the prevalence of “pure depression” between women and men but did find such a difference in the prevalence of “somatic depression,” with women being twice as likely to have symptoms of the disease than men (cf. Kapfhammer, 2006). In other words, somatic symptoms of depression are typical for the female sex.

Table 6. Differential analysis of the sex effect on type II symptoms among the Austrian federal states

	<i>Effect female in federal state</i>		<i>Deviation from the average effect</i>	
	<i>b</i>	<i>95% CI</i>	<i>u</i>	<i>r</i>
Vorarlberg	0.28	[0.16, 0.39]	0.01	0.02
Tirol	0.26	[0.15, 0.38]	-0.01	-0.01
Salzburg	-0.09	[-0.21, 0.02]	-0.36	-0.61 ***
Upper Austria	0.29	[0.18, 0.41]	0.02	0.03
Carinthia	0.33	[0.22, 0.45]	0.07	0.14
Styria	0.21	[0.09, 0.32]	-0.06	-0.09
Burgenland	0.29	[0.17, 0.41]	0.02	0.07
Lower Austria	0.20	[0.08, 0.32]	-0.07	-0.08
Vienna	0.45	[0.34, 0.57]	0.19	0.21 **

Note. Multiple two-level regression (MLE): *b*=regression coefficient sex (female) per federal state, *u*=deviation from the average regression coefficient (within effect) across all federal states, *r*=standardized strength of the sex effect per state; *CI*=confidence interval (bootstrapping: *N*=10000).

p*<0.05; *p*<0.01; ****p*<0.001.

Stress promotes depression (Chrousos & Gold, 1992; Claes, 2004; Dunn & Berridge, 1990; Hammen, 2005; Roca et al., 2013; Siegrist, 2008). However, neural stress processing differs

between women and men in some respects (Bale & Epperson, 2015; Bangasser & Valentino, 2014; Becker et al., 2007; Goldfarb et al., 2019; Goldstein et al., 2010; Kogler et al., 2015; Seo et al., 2011; Seo et al., 2017; Wang et al., 2007). “Both stress reactivity and regulation are core components of adaptive stress responses and have been shown to differ between men and women” (Goldfarb et al., 2019). Breaking down depression into symptom subtypes allows us to examine which subtypes are related to sex-typical stress processing. Evidence has been found here that depression symptoms that manifest as a motivational deficit (type I) are influenced by stress processing systems that do not differentiate functionally between women and men. On the other hand, symptoms of psychosomatic stress (type II) seem to be associated with sex-typical stress processing systems.

In addition, stress processing mechanisms are partly conditioned by contexts (e.g. Haddad & Meyer-Lindenberg, 2012; Helmchen, 2014; Lederbogen & Meyer-Lindenberg, 2016; Ionescu, 2005). This means that contexts can influence the effect of risk factors and also directly influence the symptoms of depression. Citing hypothesis 2 (Austrian federal states condition the effects of predictors – especially sex – on depression symptoms), we have found such conditioning context effects for the symptoms of both psychosomatic stress (type II) and motivational deficit (type I). The effect of the predictor sex, in particular, varies by federal state, which themselves present different contexts. The Austrian federal states therefore actually represent important contexts that condition the effects of the predictors on depression symptoms.

However, based on the data used, we can only speculate ad hoc as to which unobserved variables could moderate the sex-effect. For this, it is obvious to consider variables that correlate with both federal states and depression symptoms prevalence. Indeed, there is a state-level variable that represents a possible candidate: political orientation of the party that was in charge of the respective state government. Those federal states in which the sex-effect on type I-

symptoms means a greater peril for women (Carinthia, Burgenland, Vienna) were currently and, in the past, mostly governed by the SPÖ². On the other hand, the state government in the federal states³, where the sex-effect means a lower menace for women (Vorarlberg, Salzburg), is currently and usually provided by the ÖVP⁴. Assuming that there is an association between dominant values (especially the conservative-liberal dimension) and political orientation at the state level, then the results could be an indication that these values moderate the sex-effect. However, this presumption is highly speculative and cannot be deduced from the results obtained here. Data on values on individual level would be needed to test this hypothesis.

Limitations and future directions of research

There are many different inventories for measuring depression (e.g. Löwe et al., 2002; Zierau et al., 2002; Beck et al., 2013; Bech et al., 2001; Montgomery & Åsberg, 1979; Zigmond & Snaith, 1983; Maslach & Jackson, 1981; Hänsen 1991). It was the availability of GRD data (Schmidl, 2014), rather than theoretical considerations, that motivated us to use the PHQ-9 (Löwe et al., 2002) for this study. The breakdown of depression into symptom subtypes was rather arbitrary. It is true that preliminary studies suggest what specific symptoms can be classified into symptom subtypes (results not reported here; cf. Silverstein, 1999; Silverstein et al., 2013), and the differentiation into the symptom subtypes “motivational deficit” and “psychosomatic stress symptoms” seems plausible, at least under the substantive aspect. However, in order to establish theoretically and empirically robust symptom subtypes, further research on how depression gets

² The *Sozialdemokratische Partei Österreichs* (SPÖ) is a politically center-left positioned social-democratic party.

³ The information regarding the party which was in charge of the respective state government was gathered from *Parlamentsdirektion Republik Österreich* (2020).

⁴ The *Österreichische Volkspartei* (ÖVP) is a politically center-right positioned conservative party.

broken down into symptom subtypes is needed. In this vein, we have shown that an analytical approach to symptom subtypes can provide new insights regarding depression.

One empirical limitation of this study is the potentially limited range—that is, the strong homogeneity—of collective contexts. Research has successfully proven the conditioning effect of the Austrian states on the prevalence and type of depression, indicating that the contexts they offer varies significantly by state. However, we would expect to see further conditioning contextual effects if we were to magnify the heterogeneity of contexts by looking at cross-country and cross-cultural data.

While it is an important finding of our study that there are conditioning contextual effects of the Austrian federal states, the latter are not in themselves substantial variables. This implies a strong theoretical limitation: observing these conditioning contextual effects merely states that it originates from unobserved variables that correlate with the federal states. Future research should seek to identify the relevant variables at the collective level, and to integrate them into a theoretical framework.

Conclusions

Our results confirm the existence of sex-typical symptoms of depression—namely, that psychosomatic stress symptoms of depression are typical for women—but that the association between sex and the symptoms of psychosomatic affection is context-dependent. Future research should seek to identify the specific variables behind these conditioning contextual effects. Symptoms associated with a motivational deficit, we found, are not sex-typical in sum but context-dependent.

On the one hand, the findings here underline that the diagnosis of depression should refer less to a heterogeneous construct, but rather to symptomatically homogeneous sub-types. On the

other hand, diagnostic use of the concepts of "male depression" and "female depression" is often - but not always - a helpful differentiation. This is because focusing on sex-typical depression can lead to misdiagnosis under certain conditions – which are not yet fully understood.

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