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A resampling approach to gender relations: the Rebešovice cemetery

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Abstract

Early Bronze Age society in Central Europe is often depicted as a society dominated by males. It is suggested that archaeological evidence is not always in agreement with this view. This study reports the analysis of mortuary variability at the Early Bronze cemetery Rebešovice in Moravia (Czech Republic) that uses computer-intensive resampling techniques. The results indicate that there are only minor differences in the mortuary treatment of females and males. There is neither a qualitative restriction of body treatment and objects buried with males, nor a quantitative emphasis on burials of males. In fact, burials of females are equipped with a higher number of bronze artifacts. Funerals of females were at least as significant social events as the funerals of males. We argue that the model of a male dominated community that used this cemetery is unwarranted. These findings do not refute the existence of gender-specific activities and roles that may be valued differently, but instead suggest that both females and males had access to resources from which they could draw power.

Keywords: Central Europe; Early Bronze Age; Gender inequality; Mortuary practices

1. Introduction

A substantial problem in anthropological archaeology is the understanding of gender relations in the past. Most archaeologists believe that this insight is possible through investigation of material remains that come from settlement and mortuary contexts. Although extensive archaeological evidence from both the Early Bronze Age (ca. 2200–1700 B.C.) settlements and cemeteries in Central Europe is available, the relations between females and males are still subject to discussions.

There are two main views of gender relations in the Early Bronze Age in Central Europe that we will call the traditional and alternative views. The traditional view (Bátora, 1991; Furmánek et al., 1991; Neugebauer, 1994; Neustupný, 1967, 1978) favors the model of a society dominated by men who pursue prestige through activities performed in the public sphere, such as subsistence labor, exchange of commodities, or warfare. The dominance of males, sometimes even designated as patriarchal (Neustupný, 1978), stems primarily from the biological predispositions. These predispositions give males physical strength and aggression for the performance of heavy agricultural labor or fighting and more flexibility for traveling because of weaker attachment to the domestic sphere and child rearing. Females are viewed as individuals with limited agency who passively accept the dominance of males.

The alternative view stems from the general critique of the projection of gender stereotypes to the past (Arnold, 2002; Arnold and Wicker, 2001a; Conkey and Spector, 1984; Gilchrist, 1999; Nelson, 1997). It emphasizes different sources of prestige for females and males, and therefore undermines simplified models of masculine dominance. In the Early Bronze Age in Central Europe, a considerable amount of wealth found in the burials of females suggests that females were valued as significant individuals in society (Shennan, 1975, 1982; Weglian, 2001). Similarly, iconography from the Bronze Age sites in Western Europe illustrates the ritual power of females (Levy, 1995).

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We will evaluate these two views of gender relations through investigation of mortuary remains. It is assumed that the exploration of gender in the mortuary archaeological record is possible because gender identity is formed, among others, through interaction with material culture (Arnold and Wicker, 2001b; Burmeister, 2000; Derevenski, 1997, 2000; Stoodley, 1999). In this study, we distinguish between sex and gender to avoid confusion (cf. Arnold, 2002: 239; Walker and Cook, 1998). We use the terms sex and gender as distinct concepts: sex as a biological category estimated on the basis of skeletal material by bioarchaeological methods and gender as a category that attempts to reflect the perception of sexual differences by those who are studied. Moreover, the difference between sex and gender is in their dynamics. While bioarchaeologically estimated sex is stable, gender is continuously renegotiated and confirmed (Sørensen, 2000: 52). In other words, gender is recreated via an imposition of meaning upon the human sex-related traits and actions. Although constructionists correctly claim that sex is not devoid of meaning either (Butler, 1990; Laqueur, 1990), there is one fundamental difference: Bioarchaeologically estimated sex is constructed outside the experience of the research subjects, while gender attempts to capture the perception of sex-related experience of the research subjects, alive or dead. Although there are other ways to understand the sex vs. gender difference, we believe that the distinction presented here is the most appropriate for this study. Analytically, we attempt to identify sex specific forms of mortuary treatment first and then focus on ambiguous patterns to shed light on sex-gender disjunction (cf. Arnold, 2002: 244; Stoodley, 1999: 74).

From the analytical point of view, gender falls among horizontal social differences while differences in rank reflect vertical social differences (Tainter, 1978). As Arnold (1996, 2002) pointed out, gender differences should be understood in reference to social status because the high status females may be considerably different from other females. This approach does not result in the dissolution of essential analytical categories as Derevenski (1997) proposed for age and sex. In contrast, gender and status are still distinct dimensions of social differentiation. However, the interplay between gender and status cannot be ignored because they influence each other.

The relationships between females and males may become unequal. There are two dimensions of gender inequality. The first one reflects the material well-being of females and males, while the second one stems from the value given to the activities of females and males. As Kelly (1993) has demonstrated, a perfect correlation is not necessary between material well-being and social prestige perpetuated by ideology. Therefore, archaeological burials of females that are well equipped could potentially mask the existence of gender inequality embedded in ideology. However, such an ideological dimension of inequality could become visible qualitatively. Certain forms of mortuary treatment and artifacts can be restricted symbolically to either females or males. Such gender-specific artifacts have been described in the ethnographic record (Godelier, 1999; Linnekin, 1990).

Mortuary studies often apply sophisticated statistical analyses. However, it is surprising how little attention in mortuary studies, and probably in archaeology in general, has been paid to computer-intensive resampling techniques (cf. Baxter, 2003). Despite Manly's (1996) groundbreaking work, resampling techniques have not become part of the standard analytic toolkit in mortuary studies despite the great potential of these techniques. The primary power of resampling lies in the effective distinction between random and non-random patterns. We believe that resampling techniques are well suited for mortuary studies, including the elucidation of sex-related patterns.

This study aims to explore gender inequality in the Early Bronze Age cemetery Rebešovice using primarily resampling techniques. It attempts to determine whether males received more attention in mortuary treatment than females and whether any form of mortuary treatment was restricted solely to males or females. If males dominated females, we expect that the burials of males would show a larger amount of valuable artifacts, higher frequency of grave constructions and coffins, deeper grave pits, and artifacts restricted solely to males. Since gender relations can hardly be understood separately from other dimensions of social differentiation, distinctions between adults and sub-adults as well as vertical social differences are explored to evaluate gender differences in context.

2. Archaeological context

The Early Bronze Age is characterized by an intensification of metallurgy and increasing contacts among communities at the supra-regional level (Harding, 2000; Kristiansen and Larsson, 2005; Parkinson, 2002). In Moravia (Czech Republic), emerging hilltop settlements and hoard deposition suggest political and economic transformations that influenced social differentiation (Podborský et al., 1993). Although social changes were not as dramatic as envisioned by Childe (1930) many decades ago, the Early Bronze Age seems to be characterized by general emphasis on vertical social differences that diminish the importance of gender differences (Shennan, 1993).

The research questions are addressed on the archaeological material from the Rebešovice cemetery. This site is located in South Moravia, about 10 km from the center of Brno, on a small hill above the Svratka River (Fig. 1). The Rebešovice cemetery is a multi-component site. There are 226 medieval (6th and 9–10th centuries A.D.) graves, 80 Únětice (ca. 2000–1800 B.C.) graves (Fig. 2), one undated prehistoric grave, as well as isolated finds and features from the Neolithic, Copper Age, Bronze Age, and Roman times (Ondráček, 1962). This cemetery was excavated in 1952 and 1953 by the Institute of Archaeology at the Czechoslovak Academy of Science in Brno.

The initial description and analysis of the Rebešovice cemetery was published by Ondráček (1962). He dated this cemetery to the classic Únětice phase and pointed out the relatively short period of time that this cemetery was used. Although no absolute date is available at this time, local specialists estimate that this cemetery did not serve for longer than 100 years (Stanislav Stuchlík, personal communication, 2005). The initial analysis of mortuary variability noted that the majority

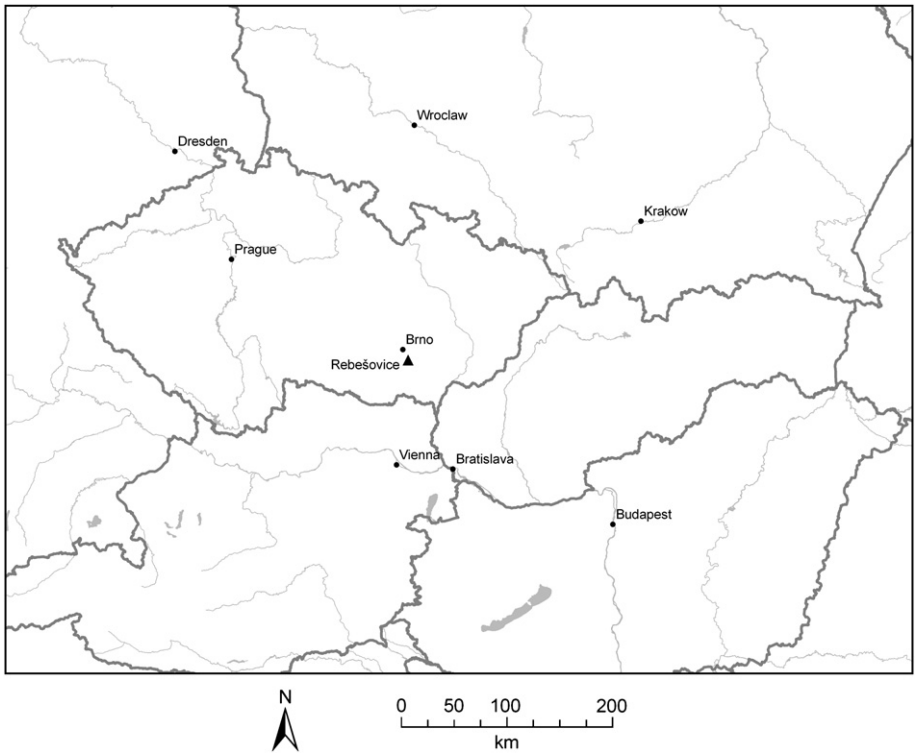

Fig. 1. Map showing the location of the Rebešovice cemetery.

of graves were disturbed, and these disturbances had occurred in the Únětice period or during the subsequent Věteřov period (Ondráček, 1962) (Table 1).

3. Materials and methods

The sample consists of 65 single burials that contain 223 artifacts from the Rebešovice cemetery. Information about the archaeological context of the Rebešovice cemetery was taken from the field reports deposited at the Institute of Archaeology at the Academy of Sciences of the Czech Republic in Brno (Král, 1954; Nekvasil, 1954; Staňa, 1954). Artifacts and skeletons were studied in the Moravian Museum in Brno.

The sex of the skeletons was allocated through the assessment of pelvis, femora, tibiae, and humeri using the primary and secondary sex analysis (Murail et al., 1999). The primary analysis of sex allocation was based on the set of five pelvic morphological features (Brůžek, 2002), five pelvic measurements, and two discriminant function analyses (Brůžek, 1984; Novotný, 1975). Only those individuals with agreement in the metric and morphological sex allocation were used as the primary sample. Since the sex was allocated only to 21 individuals in the primary analysis, we enlarged the primary sample through the incorporation of 41 individuals from Late Copper Age and Early Bronze Age sites in Central Europe (see Sládek et al., 2006a; Sládek et al., 2006b). The combined samples were used for the construction of discriminant functions that were used in the secondary sex analysis.

For the secondary sex allocation, 14 discriminant functions were computed using different combinations of pelvic, femoral, tibial, and humeral measurements from the primary allocated individuals. The correct classification of the secondary discriminant functions ranged between 89% and 99% of the primary allocated individuals. The final decision for the sex allocation was based on the consistency between the results of primary and secondary analyses. When only data for the secondary discriminant functions was available, the allocation was based on the majority of allocations embodied in posterior probabilities of the discriminant functions. If an agreement between the selected parameters was not reached, an individual was allocated as indeterminate.

Two broad age groups were used in this study: sub-adults and adults. Sub-adults were estimated on the basis of dental development and stages of epiphyseal union. Adults were estimated on the basis of the complete epiphyseal union of long bones and/or closure of the sphenooccipital suture (Buikstra and Ubelaker, 1994; Ferembach et al., 1980; Smith, 1991; Ubelaker, 1989).

The nature of postdepositional processes was investigated to understand their effect on subsequent analyses. It is expected that if grave re-opening were an activity focused on specific targets, it would result in a significant preference for certain types of burials. The association of burial disturbances with age, sex, grave depth, and number of artifacts in the burials was explored, as well as the spatial distribution of disturbed and undisturbed burials.

Correspondence analysis, which is best suited for discrete data (Shennan, 1997), was used to explore the variability in the contents of burials (cf. Bellanger et al., 2006; Burmeister, 2000; Madsen, 1988; Müller and Zimmermann, 1997). The

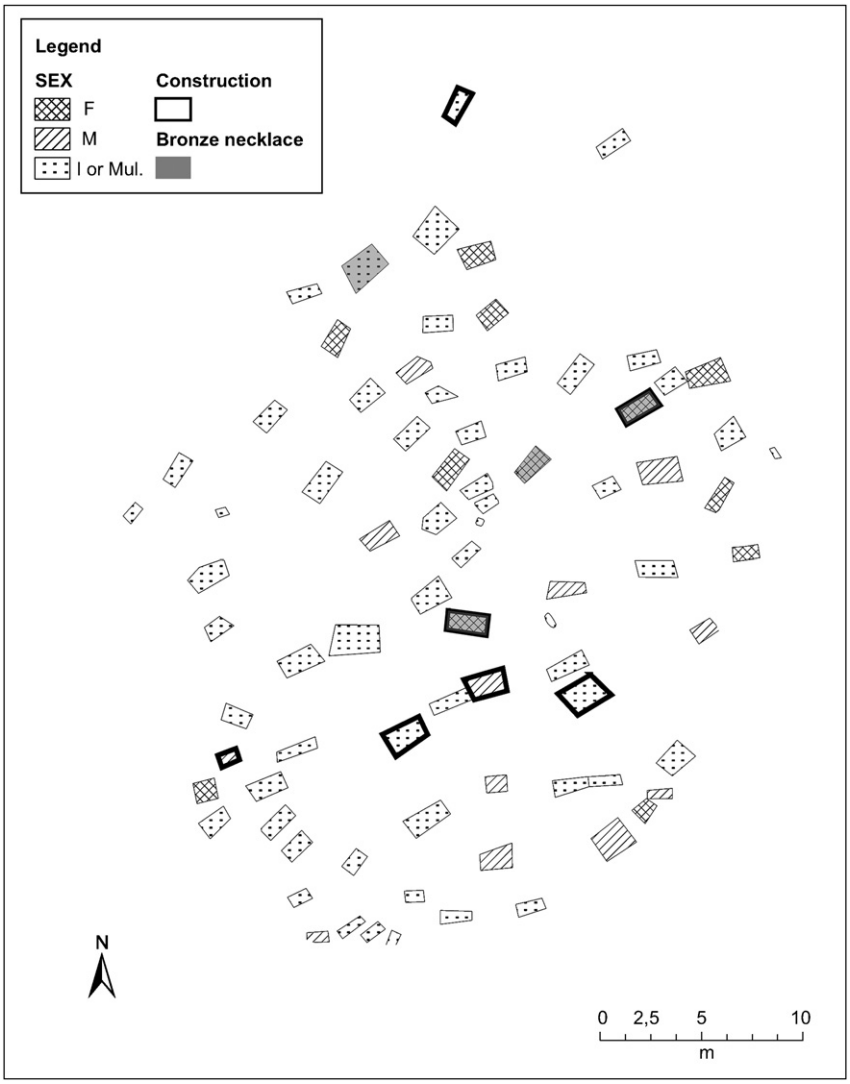

Fig. 2. Spatial distribution of the burials of females, males, burials with stone constructions and bronze necklaces. F, female; M, male; I, indeterminate; Mul, multiple individuals.

matrix contained the binary presence/absence data for 13 variables (13 variables with the highest pervasiveness in Table 2). We selected the 4% level of pervasiveness to exclude the variables with a small frequency of appearance in the cemetery from the analysis (cf. McHugh, 1999: 78; O'Shea, 1984: 66). Moreover, we converted our incomplete indicator matrix to the completed indicator matrix following the procedure specified by Gifi (1990: 72). We added 13 variables with the codes that were opposite to the 13 original variables. The completed indicator matrix with 65 rows and 26 variables was used for the correspondence analysis.

This study takes advantage of computer-intensive resampling techniques that are based on simulations of the behavior of statistical models through the generation of random samples (Baxter, 2003; Efron and Tibshirani, 1993; Manly, 1991). The strength of these techniques lies in the potential to effectively distinguish between random and non-random patterns and to test differences between samples without making assumptions about the population from which these samples were drawn (Drennan and Peterson, 2004). These techniques proved to be very effective for the analysis of patterns in cemeteries (Manly, 1996).

Initially, resampling was applied to test the randomness of the quantities of artifacts in the burials. It was expected that if the original distribution of artifacts were non-random, statistics calculated from the original data matrix would be among the extreme values obtained by resampling. We applied a modified version of Manly's (1996) method, where we randomly distributed artifacts from the original data matrix among the burials, counted the number of artifacts in each burial, repeated the process 10,000 times, and calculated the statistics Max (maximum number of artifacts in one burial), 95th percentile (the number of artifacts that cuts off lowest 95% of values), SD (standard deviation of the number of artifacts in one burial), and $\overline{ED}$ (mean Euclidean distance for the number of artifacts between the burials) for each

Table 1
Cross-tabulation of burial types according to sex and age

Burial	Sex				Age			
	Females	Males	Indeter.	Total	Adults	Sub-adults	Indeter.	Total
Disturbed	10	10	44	64	36	17	11	64
Undisturbed	2	2	4	8	6	1	1	8
Total	12	12	48	72	42	18	12	72
With artifacts	10	10	31	51	31	13	7	51
Without artifacts	2	2	17	21	11	5	5	21
Total	12	12	48	72	42	18	12	72
Single burial	12	12	48	72	42	18	12	72
Double burial	NA	NA	NA	7	NA	NA	NA	7
Triple burial	NA	NA	NA	1	NA	NA	NA	1
Total	NA	NA	NA	80	NA	NA	NA	80

iteration. Mean Euclidean distance was calculated using following formula:

$$\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\sqrt{(n_i-n_j)^2}/[N(N-1)/2],$$

where N is the number of burials, n_i and n_j refer to the number of artifacts in burials i and j.

Since the variables coffin, construction, and stone could not appear more than once in a single burial, we modified the resampling algorithm to permit only single occurrence of these variables in a single burial during resampling. Finally, the statistics from the original data matrix were compared with their distribution obtained by resampling (Fig. 3). The original data matrix included counts of specific artifacts.

Table 2
Frequencies of single burials with specific artifacts

Artifact	Burials containing the artifact type							
	Sex				Age			
	Females	Males	Indeter.	Total	Adults	Sub-adults	Indeter.	Total
Coffin	7	7	32	46	23	14	9	46
Liquid container	5	8	20	33	20	7	6	33
Large stone	6	4	16	26	12	8	6	26
Ceramic bowl	1	6	11	18	10	5	3	18
Bronze pin	5	2	9	16	10	3	3	16
Bronze hair spiral	8	0	6	14	11	1	2	14
Animal scapula	1	1	6	8	3	3	2	8
Stone construction	2	2	1	5	5	0	0	5
Bronze necklace	3	0	1	4	4	0	0	4
Bronze awl	3	1	0	4	4	0	0	4
Bronze bead	1	0	2	3	1	1	1	3
Bone artifact	0	1	2	3	3	0	0	3
Bronze tube	0	0	3	3	1	0	2	3
Chipped stone	0	0	2	2	2	0	0	2
Bronze bracelet	0	0	1	1	1	0	0	1
Other ceramics	0	0	1	1	0	0	1	1
Bronze chisel	0	0	1	1	0	0	1	1
Bronze dagger	0	0	1	1	0	0	1	1

In the second analysis, we tested whether burials of females and males contain different artifacts. It was expected that if the original distribution of artifacts were significantly different between females and males, the original difference in the average number of presences for each type of artifact between females and males would be among the extreme values obtained by resampling. The average number of presences for each type of artifact from the original presence/absence data matrix was computed separately for female and male burials. The difference in the average number of presences for an artifact a between females and males (MF_a) was calculated using the following formula:

$$MF_a = \sum_{i=1}^{n_M} a_i/n_M - \sum_{j=1}^{n_F} a_j/n_F,$$

where n_F (n_M) refers to the number of female (male) burials, a_i (a_j) is equal to 1 when artifact is present in the i-th male (j-th female) burial and 0 in the case of the absence of artifact a.

Then the data matrix was resampled by random shuffling the categories of female and male 10,000 times. After that, the female values were subtracted from the male values for each iteration and the results were compared with the subtracted values in the original data matrix. To check the validity of our results, we also conducted Fisher's exact test for contingency tables (Cytel_software, 2005; Fisher, 1922) that were based on the relationships between sex and artifacts. Fisher's exact test can be considered as an effective tool for the contingency table analysis with a low number of observations in the cells.

Resampling was used also for testing the differences in the dimensions of graves, artifacts, and the number of artifacts in the graves. The randomization procedure that we used was similar to the procedure described in Manly (1991: 6–9). Differences between two samples (e.g., females vs. males) were tested. We used t-statistic as the test criterion. Student's t was calculated according to the following formula:

$$t = (\bar{y}_1 - \bar{y}_2)/\sqrt{s_p^2/n_1 + s_p^2/n_2},$$

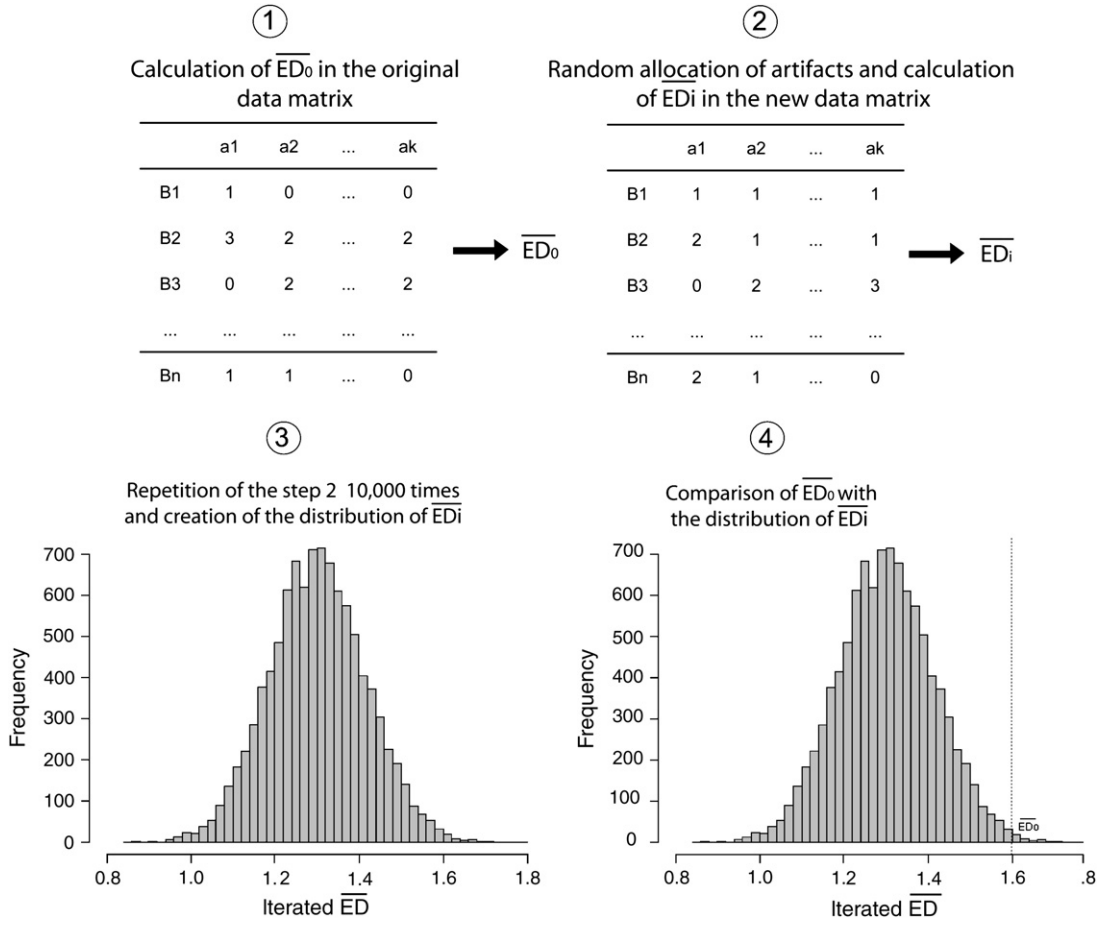

Fig. 3. Schema of testing the random nature of the distribution of the number of artifacts in the Rebešovice cemetery (example of $\overline{ED}$, mean Euclidean distance for the number of artifacts between burials). $\overline{ED}_o$, original value for the Rebešovice cemetery; $\overline{ED}_i$, iterated values; a, artifacts; B, burials. The dotted line in the histogram (step 4) shows the position of $\overline{ED}_o$ that falls to the right tail of the distribution ($p < 0.01$).

where the pooled estimate of the common within-group variance was

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

(Manly, 1991; Zar, 1999).

It was expected that if the original samples were significantly different, the original *t*-statistic would be among the extreme values obtained by resampling. First, *t*-statistic was calculated. After that, categorical variable (e.g., female vs. male) was randomly assigned to burials and *t*-statistic was calculated again. Then, we repeated the entire procedure 10,000 times.

Spatial distribution of variables was explored in GIS, focusing on the search for spatial patterning that would validate the patterns detected statistically (cf. Neustupný, 1997). The distribution of graves was digitized from the plan published by Ondráček (1962).

Data for all analyses were prepared in MS Excel 2002. Resampling was performed in MS Excel 2000 using VBA macros. Correspondence analysis took place in R 2.3.1 and spatial analysis in ArcView 9.0.

4. Results

4.1. Postdepositional processes

Table 1 indicates that disturbances are not associated with any specific age group ($p = 1.0$, Fisher's exact test) or sex ($p = 0.66$, Fisher's exact test). In addition, the distribution of preserved burials does not show evidence of spatial patterning. The difference in the number of bronze artifacts between preserved and disturbed burials is statistically significant ($p = 0.006$, randomization test). The comparison of grave depth between the disturbed and preserved burials shows that preserved burials have significantly shallower grave pits ($p = 0.015$, randomization test).

Although postdepositional disturbances were not focused on a specific group of individuals, they influenced the burial content. However, the significantly higher number of bronze artifacts in undisturbed burials is highly influenced by one outlier; Burial 298 with 11 bronze artifacts. Another randomization test that excluded this outlier produced a non-significant result at the 5% significance level ($p = 0.071$). Moreover, in contrast with the expectations, the undisturbed burials are significantly shallower.

4.2. Randomness in artifact distribution

The results of resampling are presented in Table 3. They indicate that the distribution of the number of artifacts in individual burials differs significantly from the random simulations. The parameters 95th percentile, SD, $\overline{ED}$, and Max were all highly significant. Therefore, the distribution of artifacts in graves does not appear to be random; some graves contain many artifacts, others very few.

4.3. Sex and age differences

Table 2 illustrates the frequencies of specific artifacts and their relationship to age and sex. It shows that bronze hair spirals were found exclusively in female burials, especially in the burials of adult females. Additional testing uncovered that bronze hair spirals are the only artifact type that show a significant association with either males or females (Table 4). Bronze necklaces (ring ingots) are associated only with females but their frequency is too low to argue for their sex-specific appearance. Similarly, the association of bone artifacts with males is inconclusive because it is represented by a single case only. There are artifacts such as bronze awls, necklaces, tubes, bone artifacts, chipped stones, and stone constructions that are associated only with adults but the relationships are not statistically significant (Table 5).

The association of specific types of ceramic vessels with sex and age is described in Table 6. Onion-like vessels are associated only with adult females. Miniature 'infantile' vessels are associated with both adults and sub-adults. The dimensions of ceramic vessels (Fig. 4) show that neither females nor males are associated with significantly larger or smaller dimensions: this trend is non-significant for both rim diameter ($p = 0.37$, randomization test) and height ($p = 0.24$, randomization test).

Table 7 describes the comparison of the number of bronze and non-bronze artifacts between the burials of females, males, adults, and sub-adults. Randomization tests indicate that female burials contain significantly more bronze artifacts. Bronze artifacts appear more frequently and in larger quantities in burials of females than males.

There is only one significant result for the dimensions of grave pits. Sub-adults are buried in significantly shorter grave pits than adults ($p < 0.001$, randomization test). The differences between females and males are non-significant for the grave length, width, and depth. Therefore, there is no sign of a differential investment in the preparation of the graves for females and males. Moreover, both females and males are buried in the graves with stone constructions.

In conclusion, females are buried with more bronze artifacts than males. Also, females are exclusively associated with massive bronze necklaces that likely represent valuable objects. There are no differences in the grave dimensions between females and males. A bone awl and an Únětice cup appear only in male burials. However, the two artifacts represent single case that cannot be considered significant. Adults and sub-adults receive comparable treatment. Although some artifacts appear only in adult burials, their association with adults is not significant.

Table 3
Test of the randomness in the distribution of the number of artifacts in burials

Parameter	Value for Rebešovice	p
Max	14.0	<0.001***
95th percentile	8.6	<0.001***
SD	2.8	<0.001***
$\overline{ED}$	2.7	<0.001***

Max (maximum number of artifacts in one burial), 95th percentile (the number of artifacts that cuts off lowest 95% of values), SD (standard deviation of the number of artifacts in one burial), and $\overline{ED}$ (mean Euclidean distance for the number of artifacts between burials). p denotes achieved significance level from resampling. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table 4
Comparison of the sum of presences of a specific artifact between burials of females and males at the Rebešovice cemetery

Artifact	Resampling		Fisher's exact test
	MF_a	p	p
Animal scapula	0.00	1.00	1.00
Bone artifact	0.09	1.00	1.00
Bronze awl	−0.18	0.584	0.587
Bronze bead	−0.09	1.000	1.00
Bronze necklace	−0.27	0.217	0.214
Bronze pin	−0.27	0.367	0.362
Bronze spiral	−0.73	0.001**	0.001**
Bronze tube	NA	NA	NA
Ceramic bowl	0.45	0.066	0.063
Coffin	0.00	1.000	1.00
Liquid container	0.18	0.672	0.670
Large stone	−0.18	0.667	0.670
Stone construction	0.00	1.000	1.000

MF_a denotes the difference observed and p denotes achieved significance level from resampling and Fisher's exact test. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. NA, not applicable.

Table 5
Comparison of the sum of presences of a specific artifact between burials of sub-adults and adults at the Rebešovice cemetery

Artifact	Resampling		Fisher's exact test
	AS_a	p	p
Animal scapula	0.171	0.181	0.177
Bone artifact	−0.079	0.548	0.547
Bronze awl	−0.105	0.304	0.306
Bronze bead	0.099	0.203	0.206
Bronze necklace	−0.105	0.312	0.306
Bronze pin	−0.076	0.737	0.732
Bronze spiral	−0.164	0.287	0.301
Bronze tube	0.036	1.000	0.509
Ceramic bowl	0.049	0.752	0.747
Coffin	0.270	0.059	0.062
Liquid container	−0.063	0.770	0.770
Large stone	0.184	0.229	0.230
Stone construction	−0.132	0.300	0.306

AS_a denotes the difference observed and p denotes achieved significance level from resampling and Fisher's exact test. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$. NA, not applicable.

Table 6
Frequencies of single burials that contain specific ceramic vessels

Artifact	Sex		Age	
	Females	Males	Adults	Sub-adults
Beaker	2	7	12	5
Bowl	1	6	10	5
Decorated vessel	2	4	8	1
Mini vessel[a]	6	6	18	7
Mug	2	1	5	3
Onion-like vessel	2	0	4	0
Únětice cup	0	1	3	1

[a] Miniature vessels with both height and rim diameter smaller than 7 cm.

Table 7
Comparison of the number of bronze and non-bronze artifacts between single burials of females, males, adults, and sub-adults

	N	*p*
Bronze artifacts		
Females vs. males	24	0.002**
Adults vs. sub-adults	60	0.282
Non-bronze artifacts		
Females vs. males	24	0.155
Adults vs. sub-adults	60	0.854

N: the number of burials analyzed. *p*: achieved significance level from resampling. $*p < 0.05$, $**p < 0.01$, $***p < 0.001$.

4.4. Vertical social differences

The results of correspondence analysis are shown in Fig. 5. Although the first two dimensions only account for 32% of the original variation (Table 8), they highlight some interesting relationships. The first two dimensions of correspondence analysis point at bronze necklaces (J1), stone constructions (C1), and bronze awls (K1) that appear to be separated from the major cloud of variability. Interestingly, the most isolated burials 150 and 294 are rich female burials that are enclosed in stone constructions and contain a large number of artifacts including bronze necklaces. It is likely that this pattern reflects vertical social differences.

Figs. 6 and 7 show histograms for the number of artifacts in female and male burials. Male burials do not show any marked differences while female burials show a few exceptional burials with a large number of artifacts. Moreover, the most ''rich'' female burials tend to be associated with bronze necklaces. Therefore, a limited number of females appear to have a different status. The pattern of females with special status is reinforced when the individuals with sex-specific artifacts—i.e., hair spirals—are considered. Burial 298 contains an adult individual of indeterminate sex, who is accompanied by an elaborate head ornament composed of eight bronze hair spirals, three ceramic vessels, bronze pins, and a boar tusk. Burial 285 contains an adult individual of unknown sex who is interred with a hair spiral. The body is placed inside a substantial stone construction on its left side and oriented toward east-southeast. Such a position and the orientation of the body, combined with a construction made of 42 large stones, is unique. In contrast to the rich burials, there are also burials without any artifact (Table 1). These burials generally appear on the periphery of the cemetery.

To sum up, mortuary variability indicates that there are vertical social differences among individuals. It is important to note that adult males are not the only individuals who receive special treatment; there are females who are buried with restricted artifacts or in graves with stone constructions. The differences among females are more marked than the differences among males.

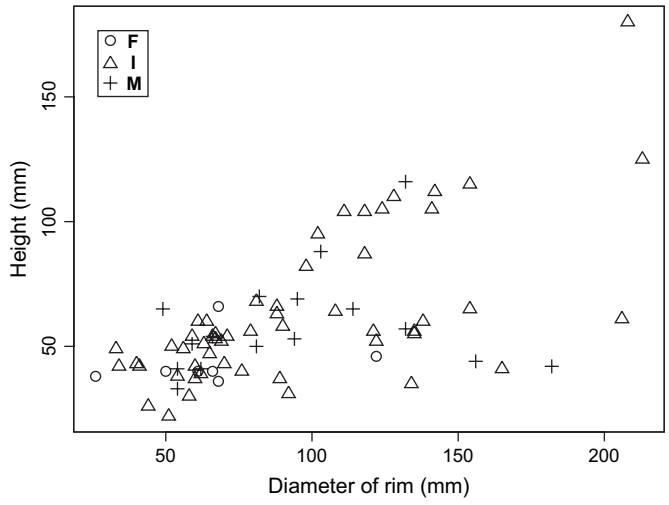

Fig. 4. Bivariate plot of height vs. rim diameter of ceramic vessels. Circles, females; crosses, males; triangles, indeterminate.

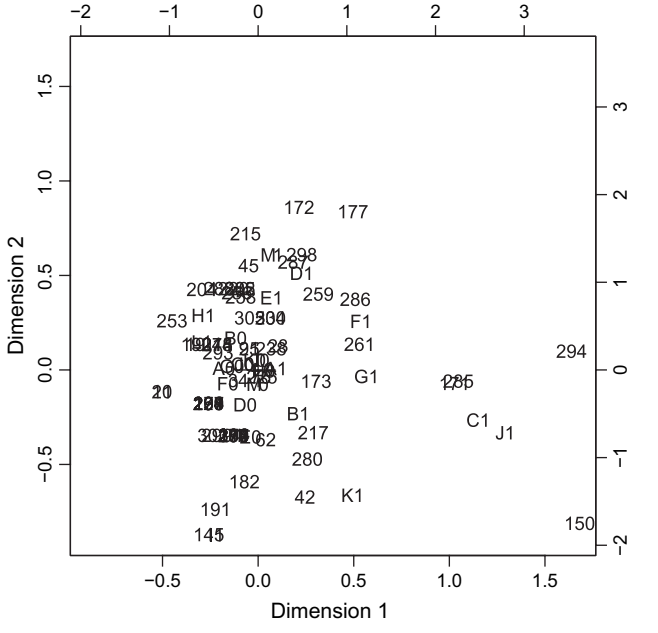

Fig. 5. Bivariate symmetric plot of the first two dimensions of correspondence analysis. A1, coffin; B1, stone; C1, construction; D1, bowl; E1, liquid container; F1, bronze pin; G1, bronze spiral; H1, bronze tube; I1, bronze bead; J1, bronze necklace; K1, bronze awl; L1, bone artifact; M1, animal scapula. Variables with 1 (e.g.; A1) designate presence and variables with 0 (e.g., A0) designate absence of an artifact. Plotted numbers without letters designate individual burials.

Table 8
Amount of variability accounted for by the dimensions in correspondence analysis

Dimension	Eigenvalue	Cumulative % inertia
1	0.171	17.08
2	0.153	32.38
3	0.115	43.83
4	0.093	53.12
5	0.088	61.93
6	0.076	69.54
7	0.066	76.14
8	0.059	82.00
9	0.050	87.03
10	0.044	91.43
11	0.035	94.91
12	0.031	98.04
13	0.020	100.00

5. Discussion

The most obvious conclusion to be drawn from these results is that there is little evidence for the dominance of males in the Early Bronze Age community that buried their dead in the Rebešovice cemetery. Females were buried with more bronze artifacts and were among the individuals who received restricted treatment embodied in grave constructions and limited artifacts. Thus, both quantitative and qualitative data indicate that the funerals of females were as socially significant events as the funerals of males. Therefore, neither the material nor ideological dominance of males is apparent in the archaeological record.

The sample of individuals, who were buried in the Rebešovice cemetery probably does not represent the entire community. The demographic profile for the Rebešovice cemetery indicates a lower frequency of infants than one would expect based on the infant mortality rates in non-industrial societies.

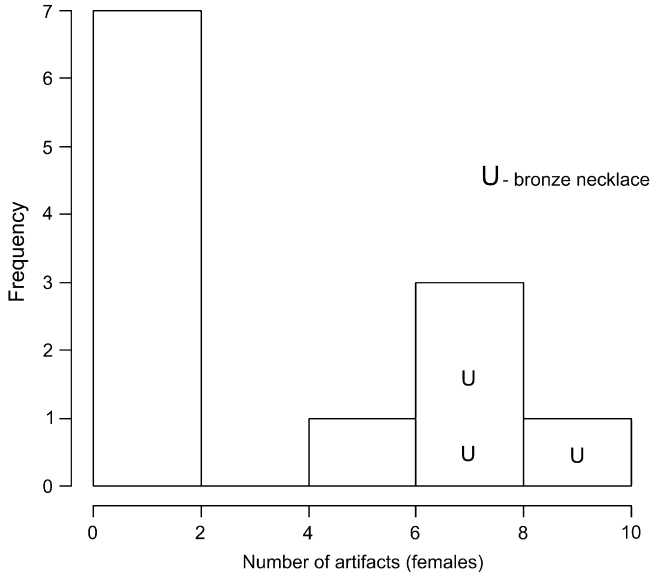

Fig. 6. Histogram for the number of artifacts and presence of bronze necklaces in female burials.

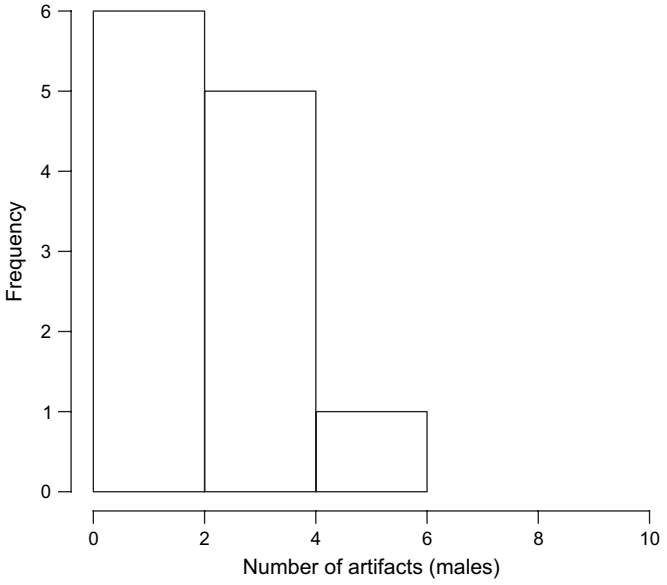

Fig. 7. Histogram for the number of artifacts in male burials.

This phenomenon is common in prehistoric cemeteries (Neustupný, 1983; O'Shea, 1996: 142). The lack of infants can be explained by a different preservation of fragile infant bones or an alternative form of disposal because the personhood of infants was not formed yet (cf. Conklin and Morgan, 1996). Since Únětice settlements show evidence of infants buried in settlement pits, it can represent an alternative form of disposal. Moreover, there are also adult females and males who are buried in Únětice settlement pits in Moravia (Salaš, 1990). Vertical social differences probably influenced the form of disposal. Since the pervasiveness of valuable metal artifacts in burials in settlement pits is much lower than in the cemeteries, it appears that this form of disposal was more apt to the individuals with low status.

Randomly generated distributions of the number of artifacts in individual graves indicate that artifacts are not distributed randomly in the Rebešovice cemetery. All the selected statistics showed a significant departure from the random pattern. It is reasonable to infer that the identities of the dead, and to a limited degree also postdepositional processes, are the primary factors responsible for the non-random distribution of artifacts in this cemetery.

Postdepositional processes influenced mortuary variability. Secondary manipulation of the bodies of the dead affected 80% of the burials and another 10% were disturbed by other postdepositional processes (Ondráček, 1962). Scholars tend to select only those burials which are intact for their analyses (O'Shea, 1984), but this approach could not be applied to this cemetery because of the high frequency of secondary manipulation with burials, which was common for this period and region (Neugebauer, 1994; Stuchlík, 1987). Graves of females, males, children, as well as elder were re-opened without any preference. Hence, this secondary manipulation was not focused on individuals of a particular social status. It seems more likely that even more graves were re-opened, but the

taphonomic signature of this process was not identified as field notes suggest (Nekvasil, 1954).

Despite the disturbances, evidence from the Rebešovice cemetery still yields data about the differences in mortuary rituals. The biasing effect of the secondary manipulation with burial content on interpretation should be seen in the disappearance of skeletal elements and some artifacts. As Ondráček (1962) noted, evidence of green patina and imprints of missing bronze artifacts suggest that bronze artifacts were moved during the re-opening the graves. Also, a significantly lower number of bronze artifacts in disturbed graves suggest that disturbances affected the bronze artifacts. However, the presence of several massive bronze artifacts in the disturbed graves indicates that the valuable metal artifacts are unlikely to be the main reason for re-opening. Although it is not possible to explore in detail the reasons for the re-opening the graves in this paper, the preliminary results suggest that looting of valuable artifacts is not the most plausible explanation. As we have argued elsewhere, it was the body itself, not the artifacts, that was the target of this manipulation (Sosna et al., 2006). Despite the problems with small artifacts, certain variables such as the presence of coffins, grave constructions, spatial distribution of the graves, and dimensions of the grave pits yield information about mortuary variability that is relatively resistant to the biases caused by secondary manipulation of burials.

The analyses show that sex and age specific mortuary treatment is limited. The position, aspect, and orientation of the body is independent of age and sex. The normative treatment of the bodies includes the placement of the crouched body on the right and orientation to the west or southwest. Stone constructions, coffins, and the majority of types of artifacts are independent of sex. There is only one exception: bronze hair spirals, which are significantly associated with females. Taking this finding one step further, we argue that bronze hair spirals reflect female gender identity (cf. Moucha, 1954; Stuchlík, 1987). Since personal ornaments and costumes are the primary media for signaling gender identity (Arnold, 2002: 241; Sørensen, 1997), the emphasis upon the highly visible head ornaments is understandable. The rare finds of bronze hair spirals in male burials in other Únětice cemeteries (Chropovský, 1960; Moucha, 1954) may reflect either incorrect sex estimations or gender transformers (cf. Arnold, 2002). The association of other artifacts such as onion-like ceramic vessels and bronze necklaces with females is based on a limited number of cases and cannot be considered as reliable gender markers.

Biologically estimated males are marked even less clearly. The single cases of a male associated with a bone awl and a male associated with an Únětice cup are inconclusive. Moreover, there are multiple examples of females, who are associated with bone awls in other Únětice cemeteries (Ondráček, 1967; Podborský, 1987; Stuchlík, 1996). Although bronze daggers in the Rebešovice cemetery come primarily from the graves with more than one individual, their supposedly masculine nature deserves a discussion. In the Rebešovice cemetery, bronze daggers come from double burials that contain indeterminate individuals, females, and infants. The association of bronze daggers with infants is not uncommon in other Únětice cemeteries (Podborský, 1987). This does not mean that bronze daggers are not associated with males. There are male burials with daggers (Horálková-Enderová and Štrof, 2000; Podborský, 1987; Stuchlík, 1987). However, the point is that bronze daggers do not seem to be primarily gender markers. Multiple examples of females with daggers (Chropovský, 1960; Moucha, 1954; Podborský, 1987; Stuchlík, 1987; Wewerka, 1982) and children in single or double burials with daggers (Ondráček, 1962; Podborský, 1987) suggest that daggers signal social standing rather than gender identity.

In this context, the phenomenon of weak gender markers in the Rebešovice cemetery may reflect the nature of the mortuary archaeological record and analytical limits than the weak impact of gender identity on praxis in the Early Bronze Age. First, the limited size of the sample of reliably sexed skeletons from the Rebešovice cemetery suggests that the relationship between sex, material culture, and gender has to be tested in other cemeteries in the future. Second, horizontal forms of social differentiation may be less redundantly marked than the vertical ones and may be perishable (cf. O'Shea, 1981). Bioarchaeological studies of bone biomechanics show that the upper limbs of females and males were exposed to different mechanical loading that presumably reflects different gender roles (Sládek et al., 2007). Thus, the scanty evidence of the markers of gender identity might have been shaped by the postdepositional processes rather than the lack of gender identity in the past.

An alternative explanation of weak gender markers is that other identities became dominant during mortuary rituals. As Shennan (1993) has suggested, vertical social differences based on ranking became the central element of social differentiation at the beginning of the Bronze Age. This does not mean that gender identity simply disappeared from daily life; it seems more likely that mortuary rituals, as a form of representation, became primarily an arena for negotiating social standing of individuals. The results of correspondence analysis show that vertical social differences structured the mortuary practices.

There is evidence of status differences among females. Both the results of correspondence analysis (Fig. 5) and histograms for the artifact quantity (Fig. 6) show that a few females were buried with a large number of artifacts in graves with the substantial stone constructions. Moreover, the presence of bronze necklaces (ring ingots) in these graves supports the high status of the females who were associated with the artifacts. Since such ingots constitute the core of Únětice hoards, there is little doubt that these artifacts were considered valuable. Moreover, lavish burials of females come from other Únětice cemeteries as well (Ondráček, 1961; Stuchlík and Stuchlíková, 1996).

One individual from the Rebešovice cemetery exhibits a mixture of supposedly feminine and masculine traits. An adult individual of indeterminate sex from grave 298 is associated with hair spirals and a boar tusk. Boar tusks are relatively rare in Únětice cemeteries but they frequently mark males in the previous Late Copper Age period. Moreover,

this grave contains the largest number of grave goods in the entire cemetery. There are at least two possible explanations for this phenomenon. First, this individual may represent a gender transformer that challenges the ethnocentric binary opposition between females and males. There are several examples from non-industrial societies that show alternative gender identities and roles (Amadiume, 1995; Callender and Kochens, 1983; Herdt, 1994). This suggests that it may be more useful to think about gender as a gradation or continuum rather than a strict binary distinction between females and males (Arnold, 2002; Arnold and Wicker, 2001b). Second, elite females may exhibit some masculine traits as a reflection of their high status (Arnold, 1996: 165; Arnold, 2002: 251). Therefore, this phenomenon points at females with power rather than an alternative gender identity or sexual orientation.

As suggested by these study results, biologically estimated females were buried with significantly more bronze artifacts than males. A higher number of artifacts in female burials is fairly common in other Únětice cemeteries (Dornheim et al., 2005; Moucha, 1954: 39; Pleinerová, 1959; Podborský, 1987). The possibility that a higher number of bronze artifacts in the burials of females was caused by deeper grave pits that were more difficult to disturb has been refuted. Disturbed graves have significantly deeper grave pits than the preserved graves. Nonetheless, a comparison of the number of bronze artifacts has to be considered with caution. First, the core of this difference is based on bronze ornaments such as hair spirals, which usually appeared in pairs. Second, although there is no indication that disturbances would have been directed specifically towards females or males, one has to remember that some artifacts might have disappeared from the burials. Regardless of these two points, there is still little evidence that the masculine element was emphasized in mortuary rituals of the Rebešovice community.

There are two possible explanations for the funerary elaboration of female burials. First, the status of females can be understood as a vehicle of their husbands' status. Rich female burials simply reflect the institution of bridewealth that perpetuates male dominance via the non-equivalent exchange (*sensu* Godelier, 1986) of ''people for things'' (Shennan, 1993: 150; Shennan, 2002: 204). Second, the funerary elaboration of some female burials may reflect the status of the females. We argue that the second explanation is more parsimonious. The artifacts in rich female burials include metal ornaments such as bronze hair rings, beads, and pins that could be considered a ''permanent part of the body'' in Sørensen's terminology (Sørensen, 1997: 102). It seems unlikely that these artifacts would be attached to the body after death as a bridewealth compensation. Massive bronze necklaces in females burials, however, could be attached to the body after death. If lavish funerals of females had been just vehicles of their husbands' status, we can assume that males would have signaled their superiority at least through restricted artifacts or forms of mortuary treatment. None of these was detected in our analyses. The presence of females in the graves with massive stone constructions and the lack of male-restricted grave goods and forms of body treatment suggest that the status of females does not have to be understood as a mere appendage to their husbands or other male relatives.

The relations between females and males in the Rebešovice community seem to be based on the principle of complementarity. In this ethnographically documented model (cf. Bodernhorn, 1993; Joyce, 1992), both females and males are considered to be necessary for the community and have access to social positions and esteem. It is possible that the attention devoted to the funerals of females and a few exceptional female burials reflect the identities of these females. *A priori* placement of females into subordinate positions may say more about the unconscious values of scholars rather than the organization of societies in the past (Arnold, 2002; Conkey and Spector, 1984; Gräslund, 2001; Levy, 1995; Moore and Scott, 1997; Sørensen, 2000). Our interpretation of the patterning in the Rebešovice cemetery does not attempt to depict an image of a community with perfect gender equality. We simply argue that the dominance of males held in the traditional view of gender relations in the Early Bronze Age is not supported by archaeological evidence from the Rebešovice cemetery.

6. Conclusions

The analysis of mortuary variability at the Rebešovice cemetery indicates that the funerals of females were as significant events as the funerals of males. Similarly, there is little difference in the mortuary treatment between adults and sub-adults. The most apparent social differences are vertical ones that crosscut age and gender. Especially, the exceptional burials of some females, a limited number of burials with stone constructions, and restricted artifacts suggest the existence of ranking.

Gender identity is marked weakly in the burials. Types of body treatment, artifacts, and grave features are not specific for either females or males. Bronze hair spirals that are associated with female skeletons provide the only clear exception. Since recent bioarchaeological studies have demonstrated that females and males engaged in different activities, it seems likely that relatively weak gender markers reflect the limits of the mortuary archaeological record rather than a lack of gender roles and identities. The quantitative analysis shows that females were buried with a greater number of bronze artifacts. Although postdepositional disturbances might have influenced the number of artifacts in the burials, they affected an equal proportion of the burials of females and males. Both females and males were buried in graves with stone constructions and females were associated with limited artifacts. To sum up, there is no evidence that funerals of males were emphasized over those of females. Apparently, the death of females mobilized a similar, if not higher, degree of social ties and material resources as the death of males.

The elucidation of gender inequality has more than one level. As the ethnographic record shows, gender inequality in material terms does not necessarily go hand in hand with inequality in terms of prestige. From the material point of view, funerals of females at the Rebešovice cemetery were not less elaborate than the funerals of males. Moreover,

male-specific symbolic restrictions are reduced to a single burial with a bone awl and an Únětice cup. The overall evidence from the Rebešovice cemetery undermines the view of a community dominated by males. Regardless of whether males were valued for their qualities, skills, or ability to perform certain activities, they were not the only people who were valued. In this context, the view of masculine dominance or even patriarchy in Early Bronze Age society in Moravia is not supported by the data from this cemetery.

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