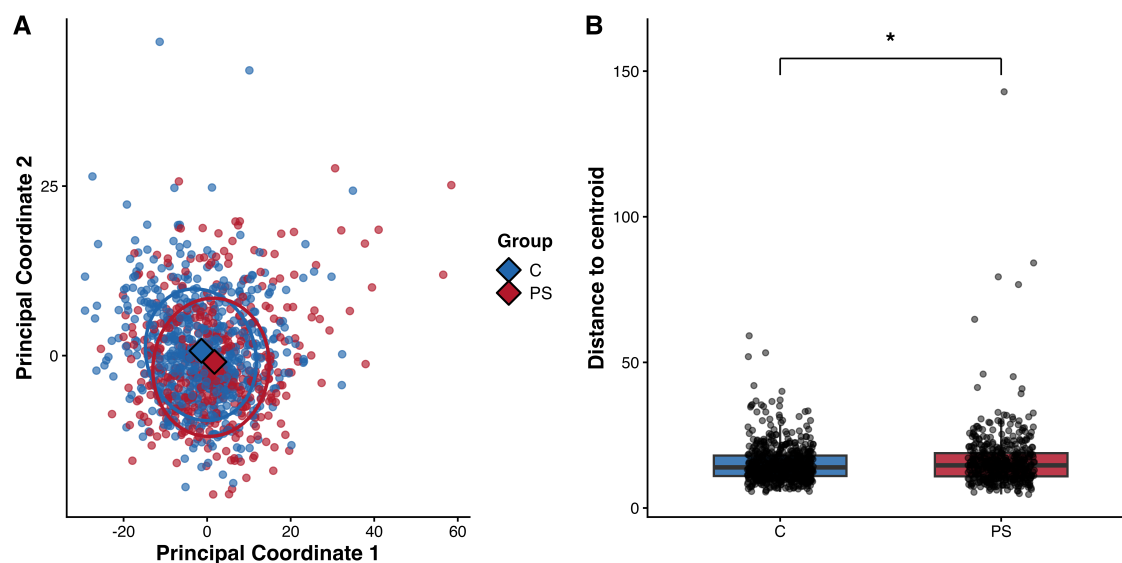
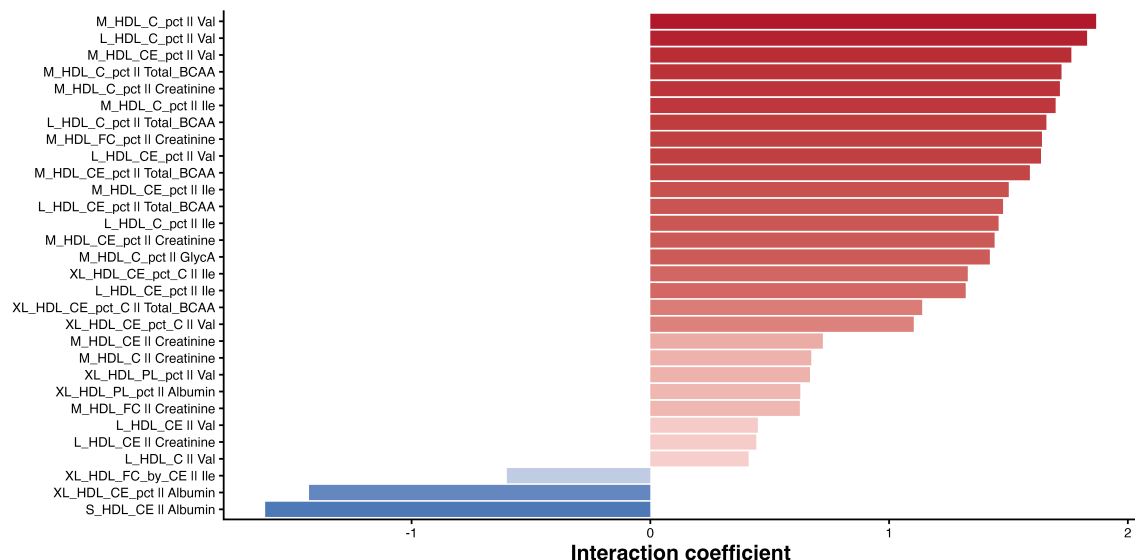


Supplementary Figures



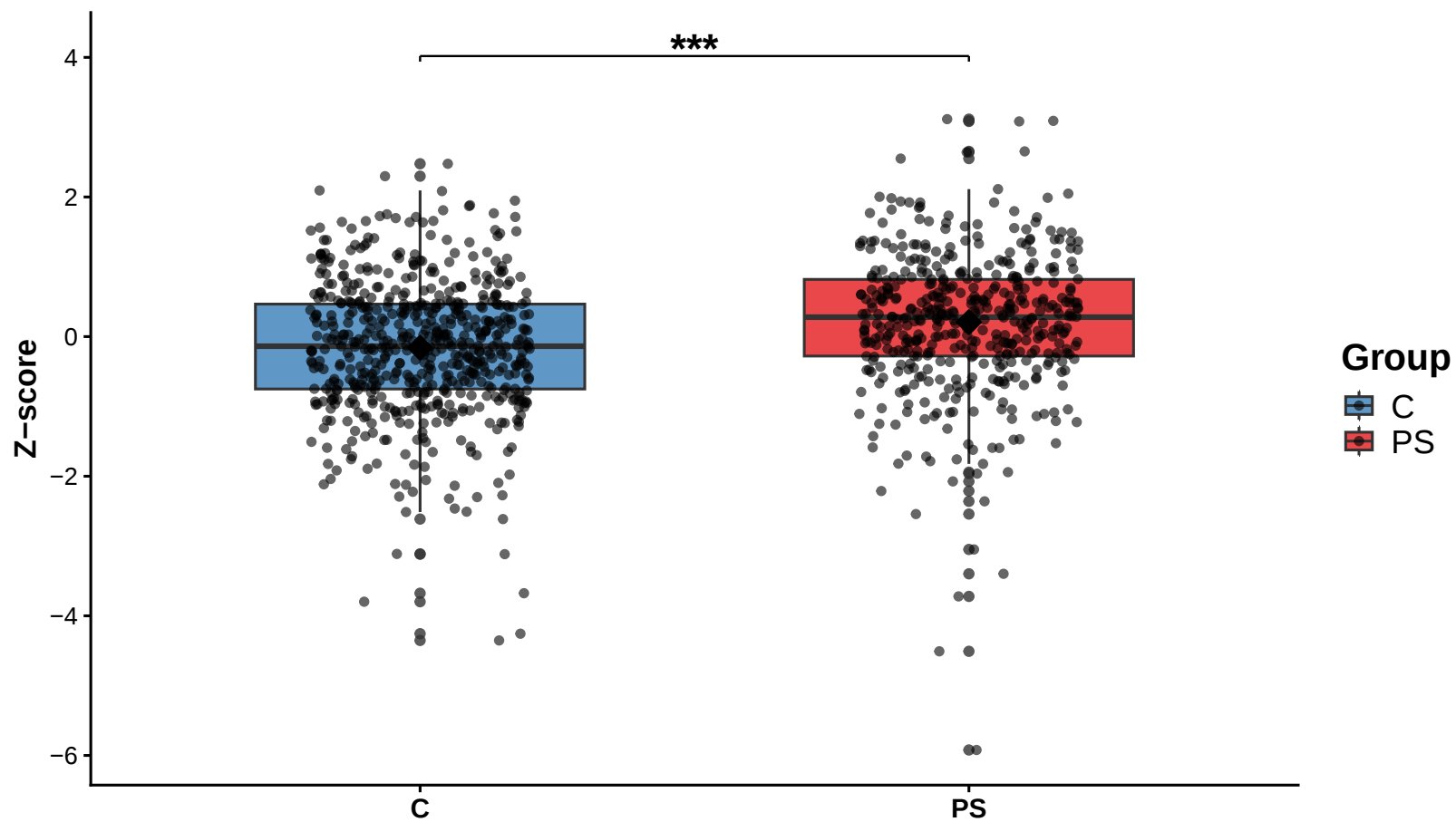
Supplementary Figure S1. (A) Principal coordinates analysis (PCoA) based on Euclidean distances calculated from all quantified NMR metabolites. Each point represents an individual participant, colored according to study group (C, controls; PS, psoriasis). Ellipses represent group-specific confidence regions and diamonds indicate group centroids. (B) Distances of individual samples to their respective group centroids derived from PERMDISP analysis. Boxplots show the median and interquartile range, while points represent individual participants. A permutation test of multivariate homogeneity of dispersions demonstrated a significant difference in metabolomic variance between groups (PERMDISP $F = 4.42$, permutation $p = 0.034$), indicating altered overall metabolomic heterogeneity in psoriasis. These findings suggest that psoriasis is associated not only with changes in metabolite concentrations but also with increased variability in the global metabolomic profile.



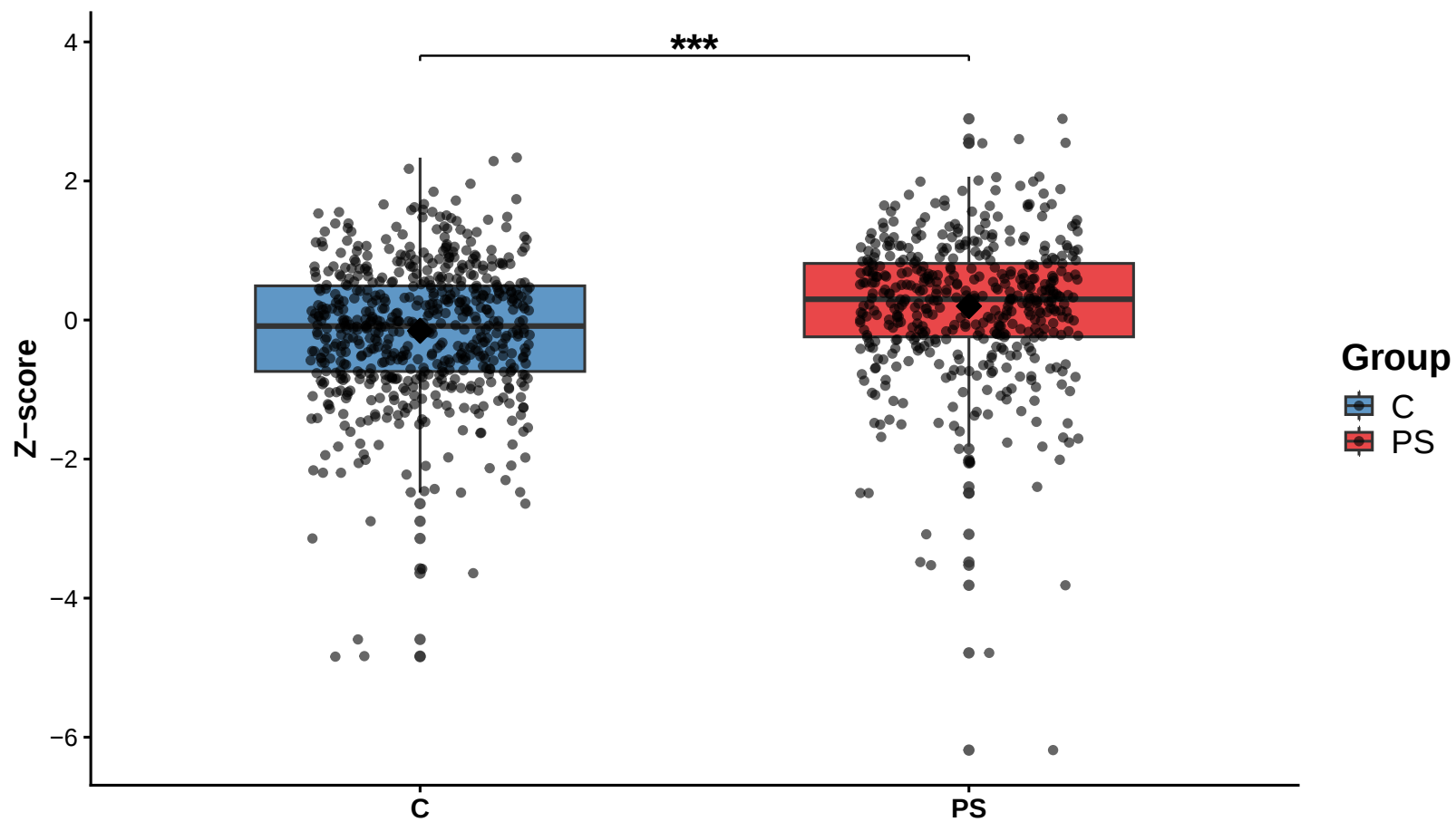
Supplementary Figure S2. Differential lipid–metabolite associations in psoriasis. The 30 most significant lipid–metabolite interaction effects identified using linear regression models incorporating lipid marker, disease status, and a lipid marker $\times$ disease status interaction term. Bars represent interaction coefficients (β), quantifying differences in the strength and direction of lipid–metabolite relationships between psoriasis patients and controls. Positive coefficients indicate stronger associations in psoriasis, whereas negative coefficients indicate weaker associations relative to controls. Biomarker pairs are ranked according to statistical significance after false-discovery-rate (FDR) correction. These results demonstrate substantial disease-specific reorganization of relationships between circulating lipids and metabolites, suggesting altered metabolic network connectivity in psoriasis.

Upregulated biomarkers

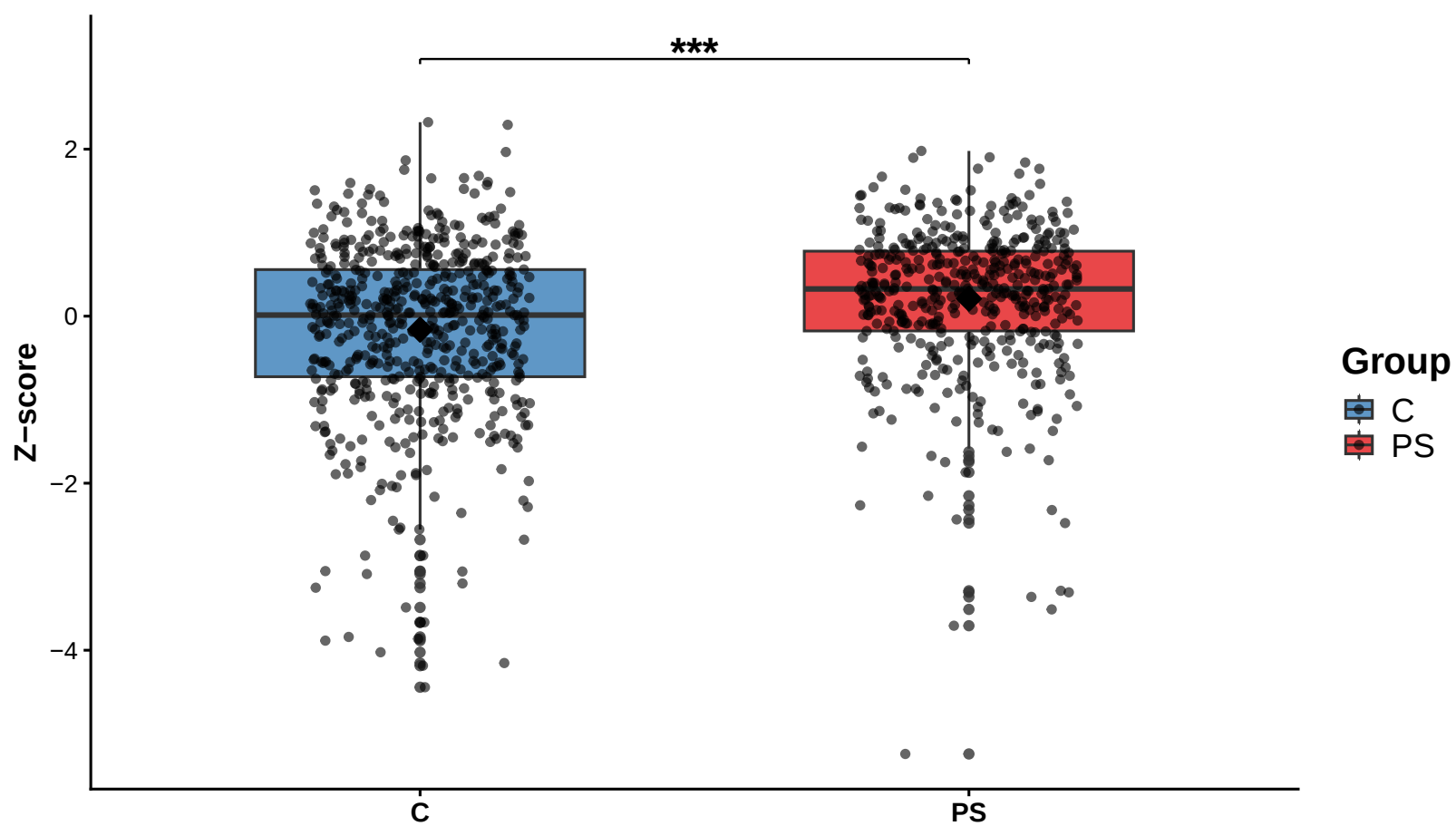
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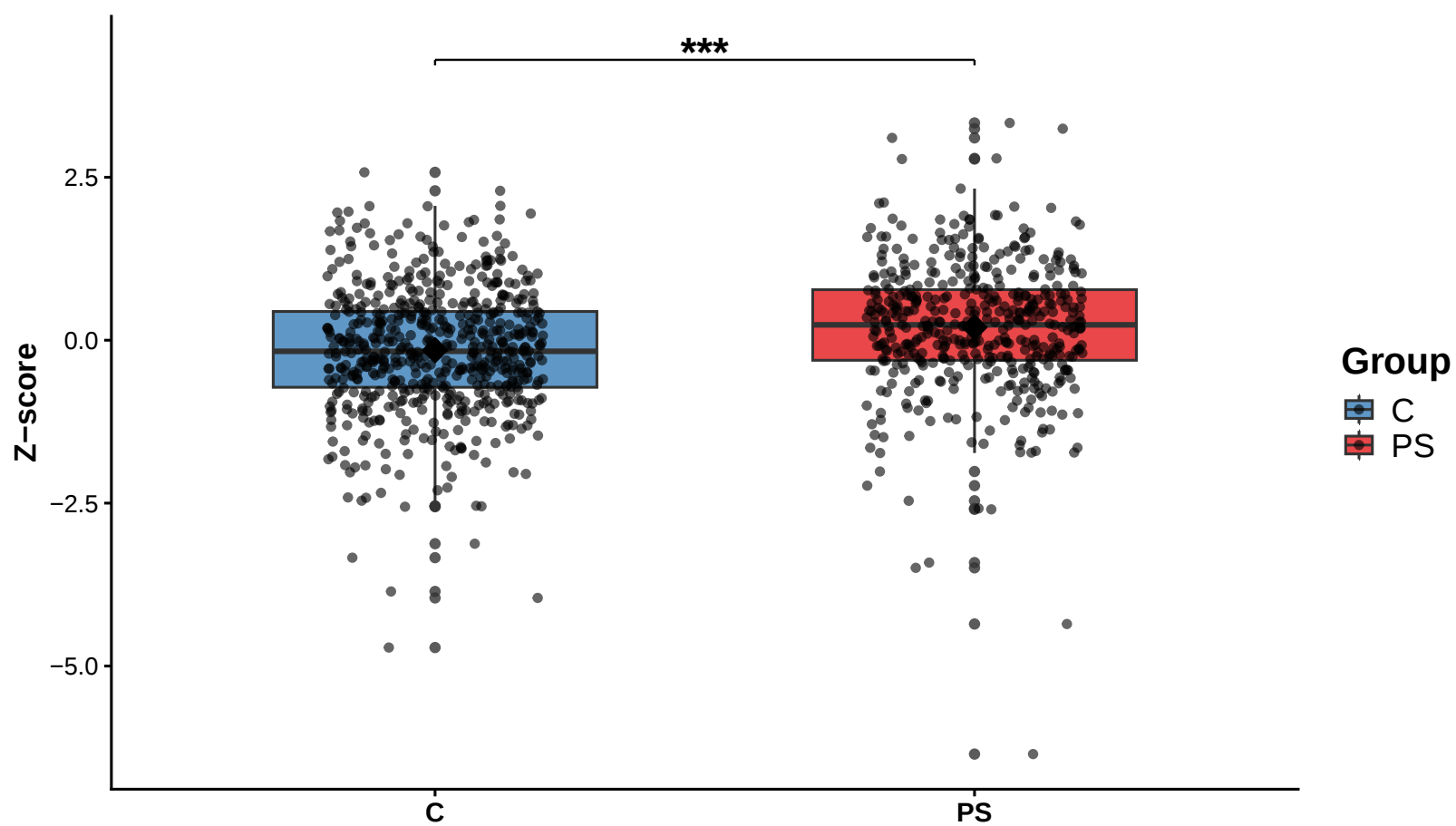
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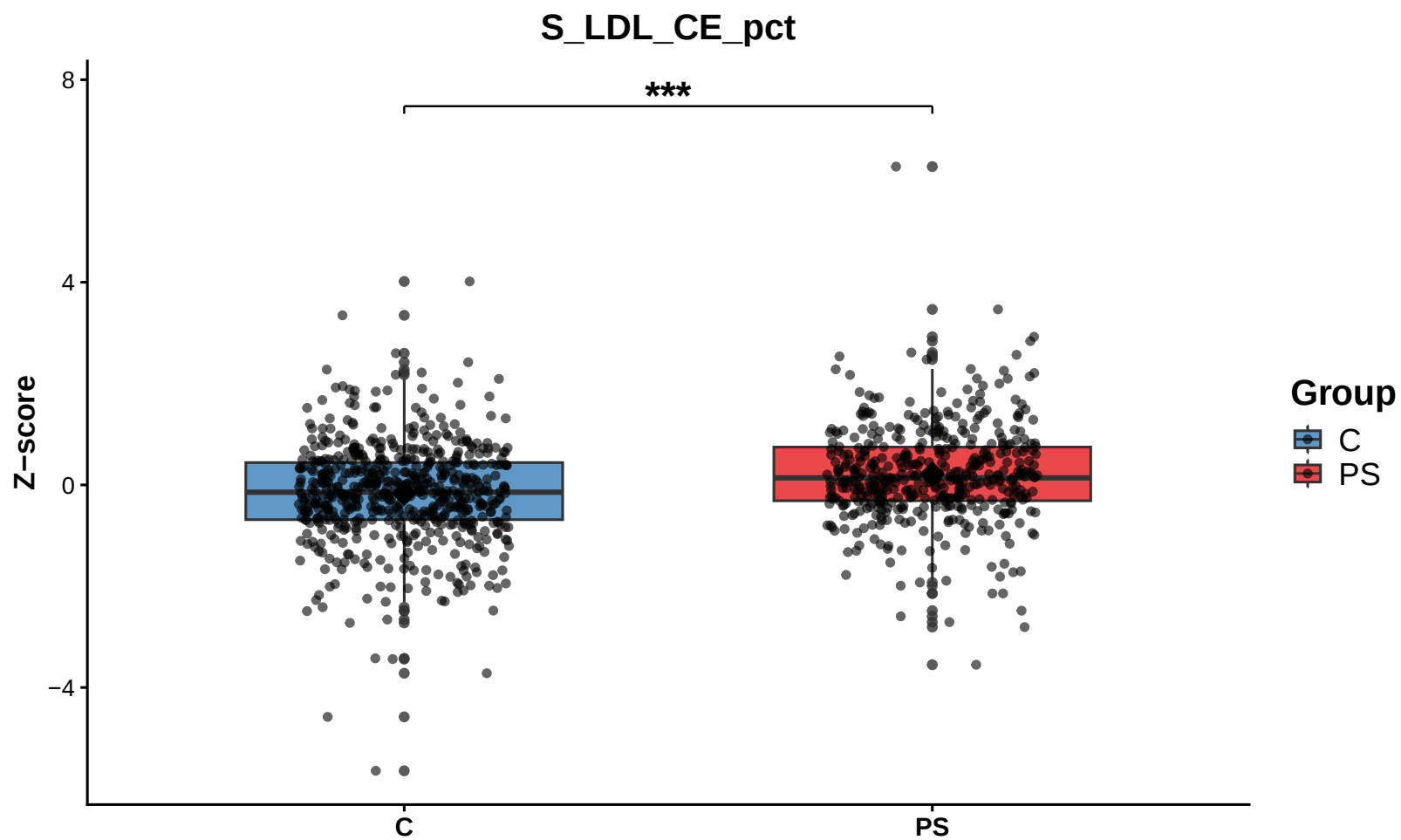
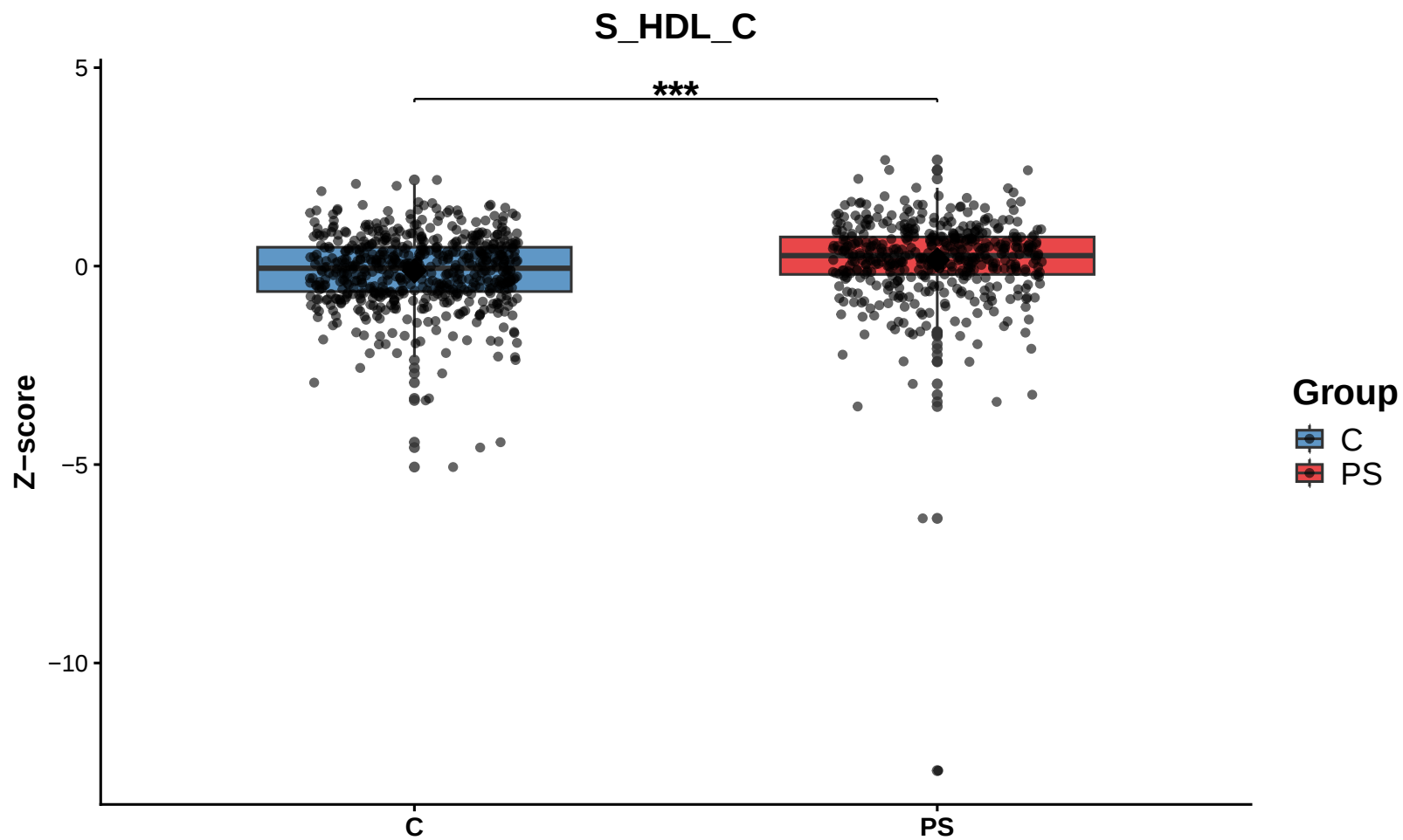


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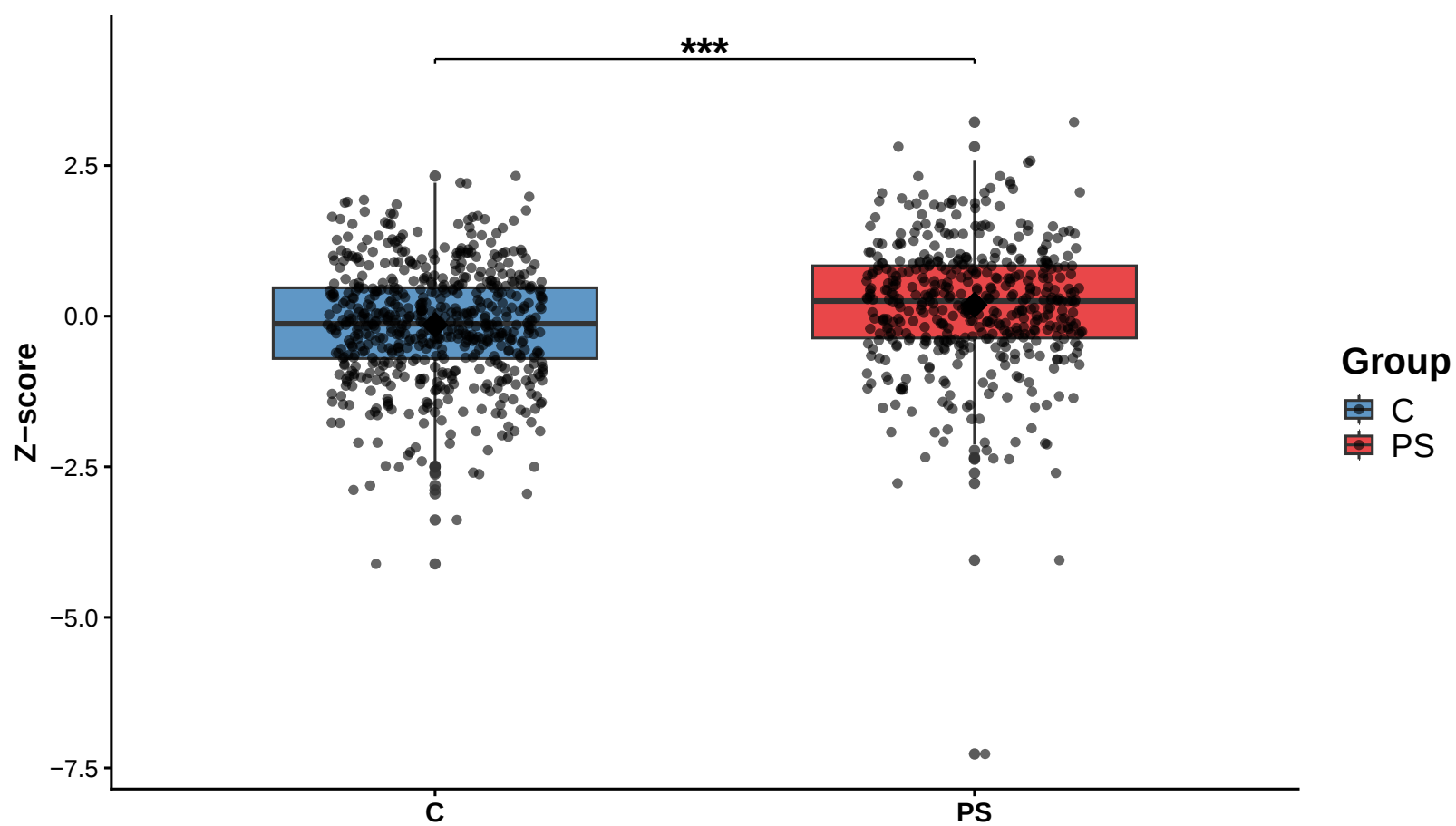


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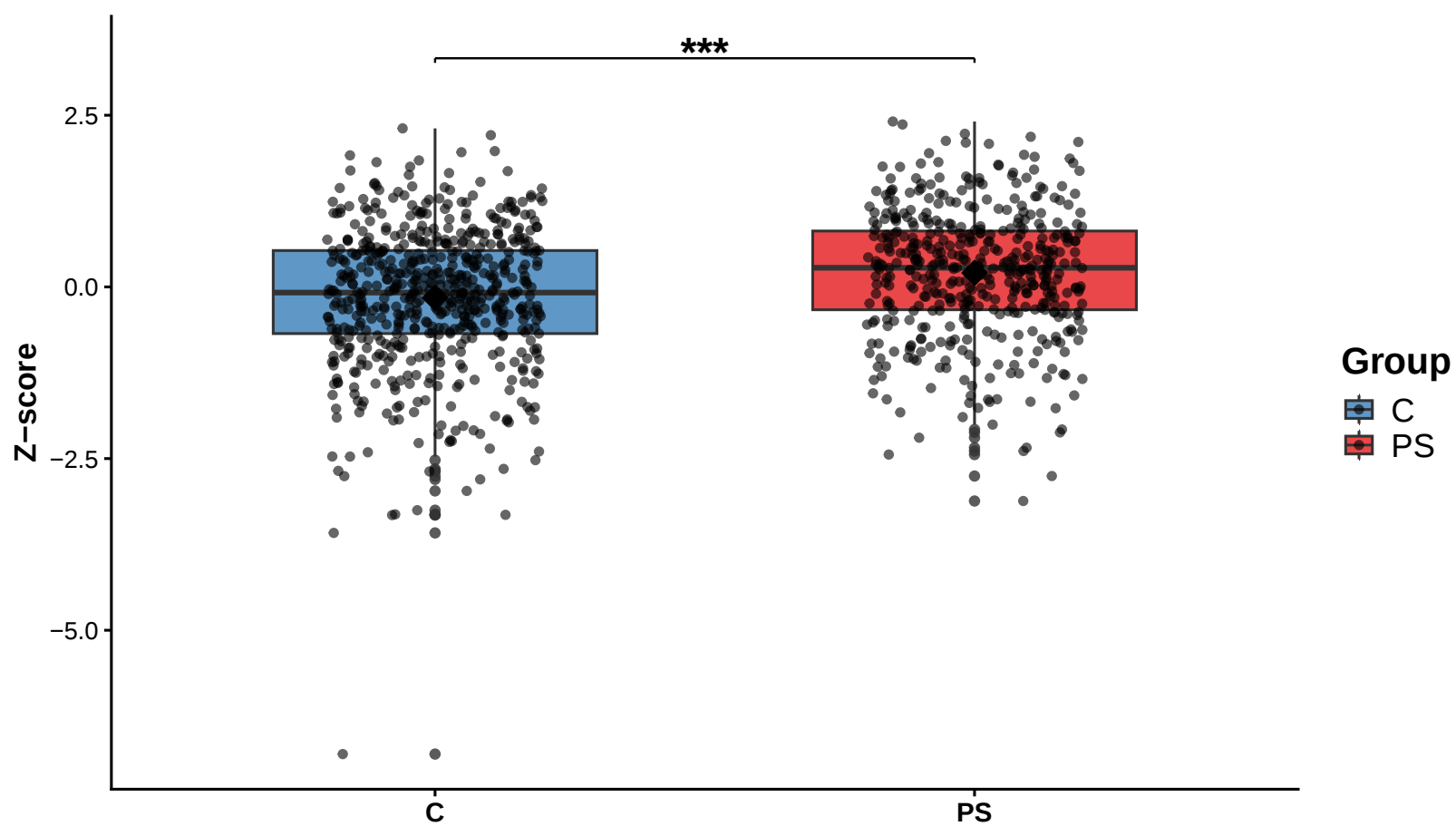




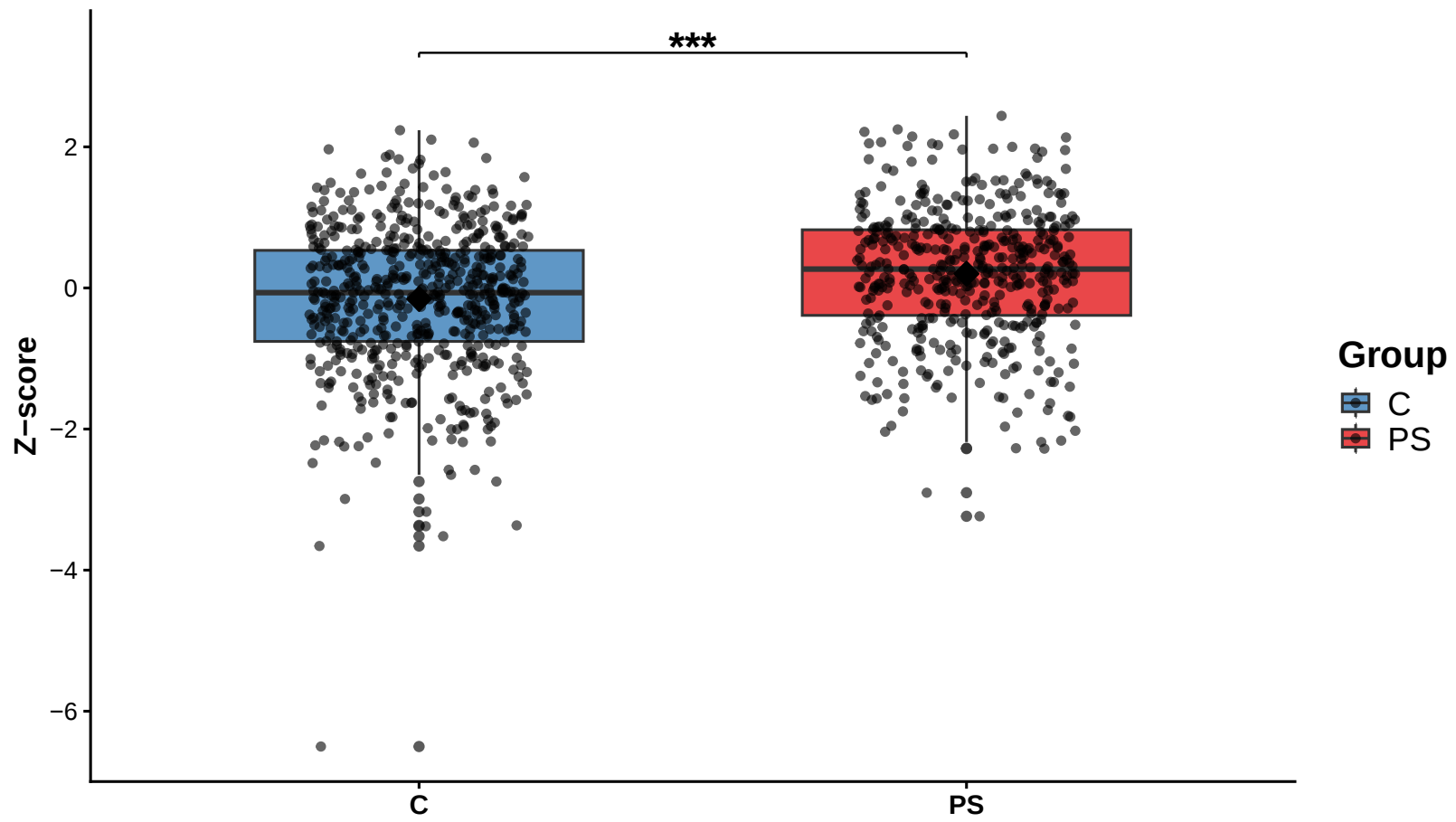
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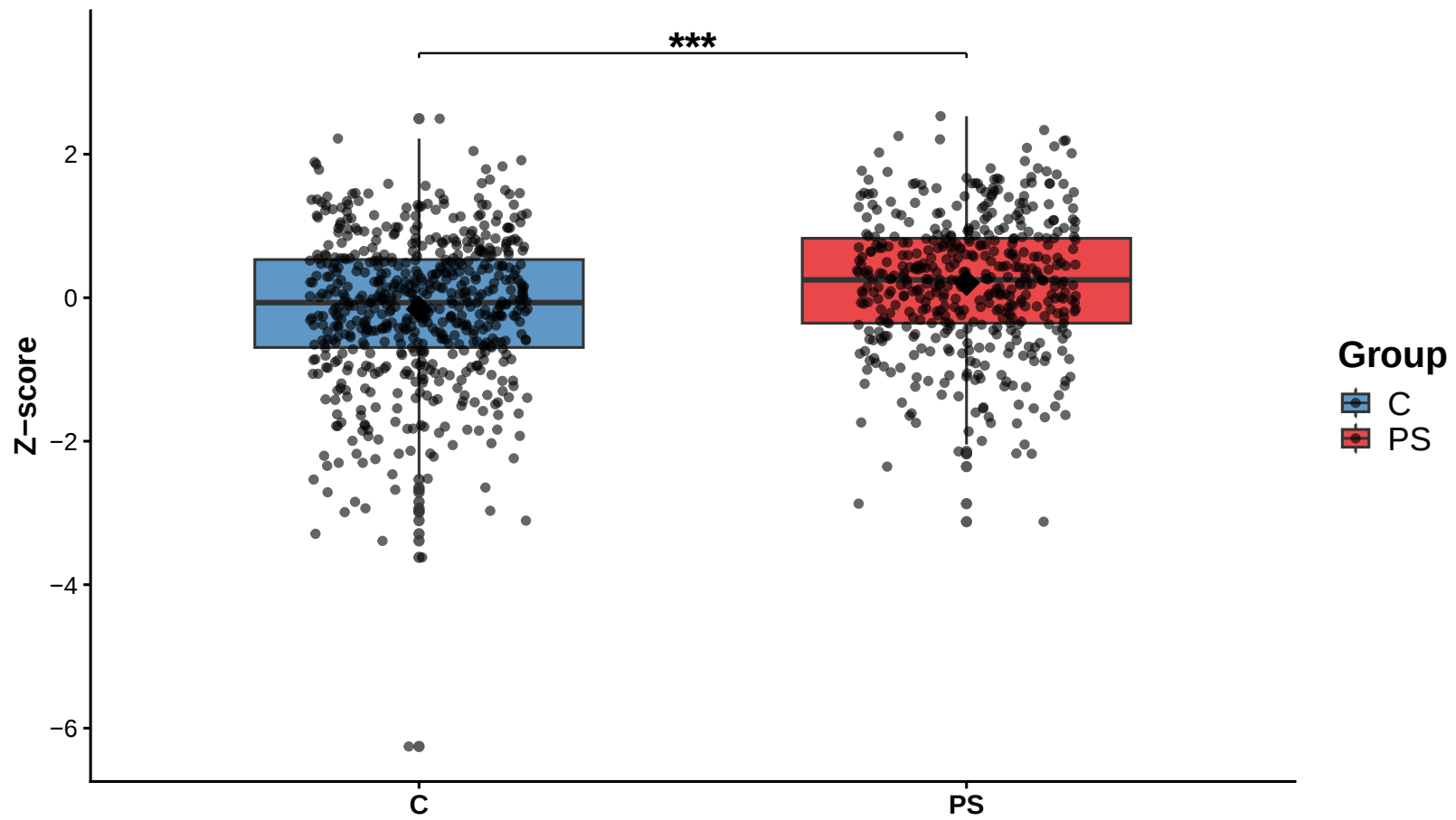
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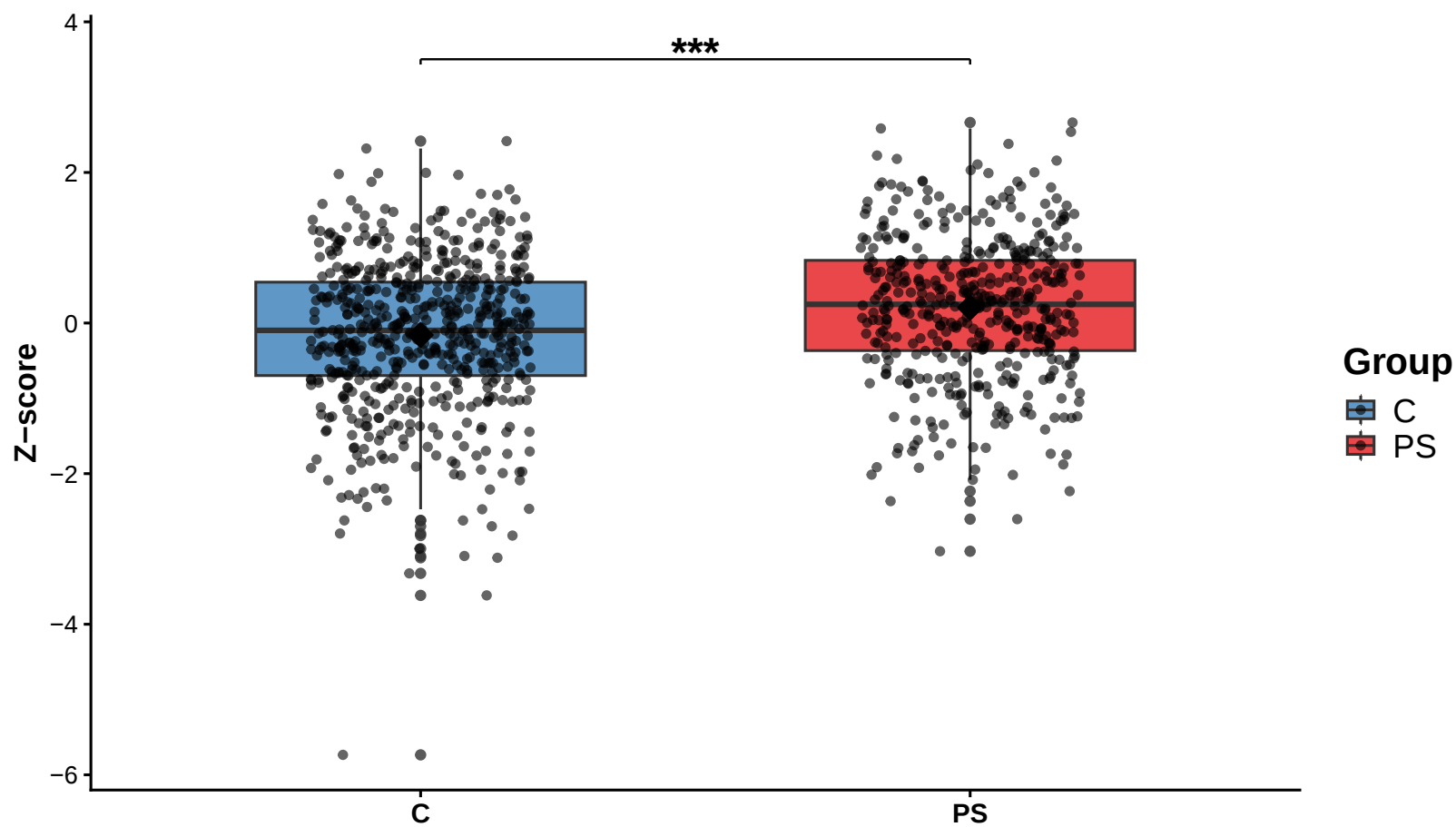
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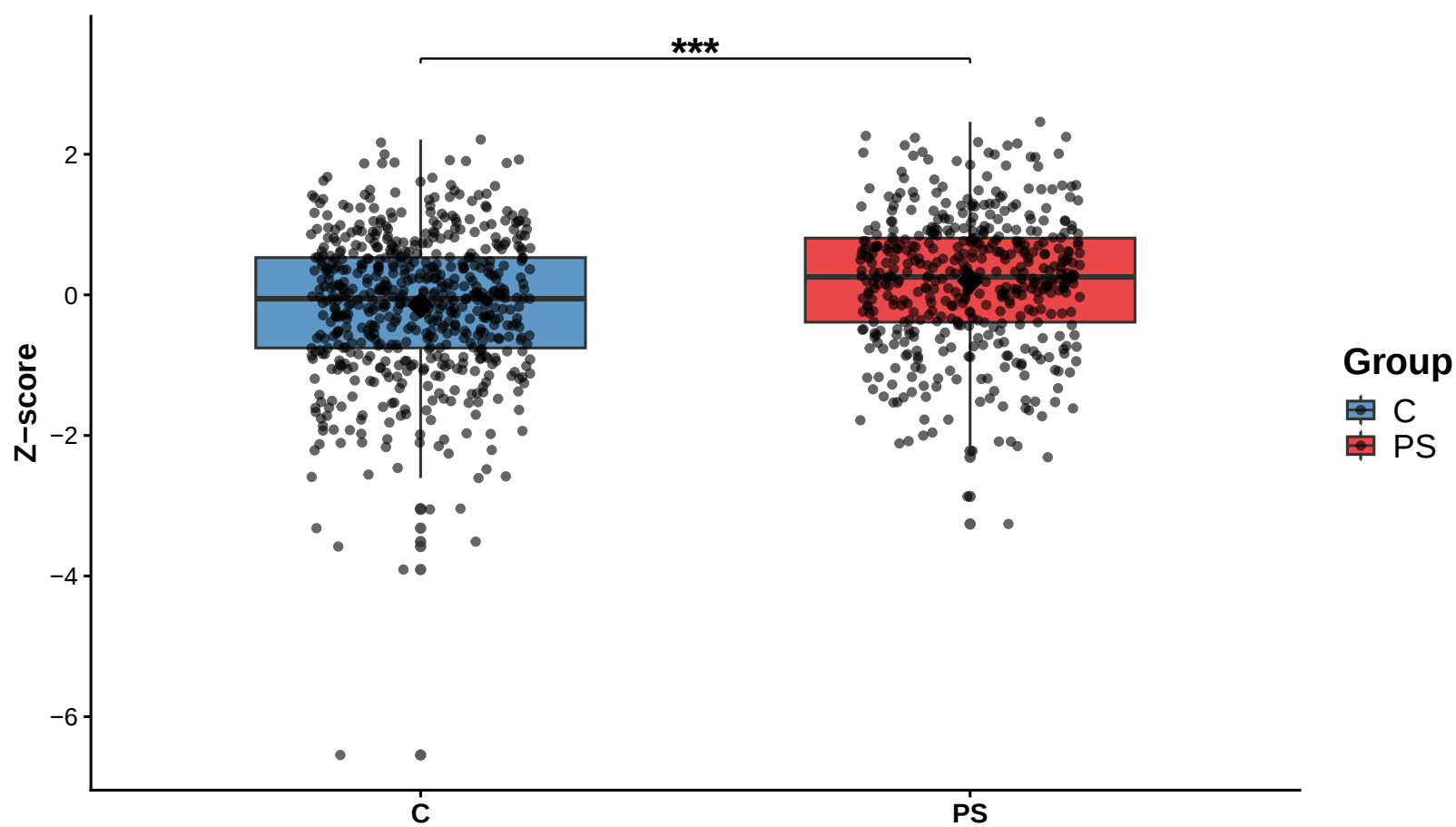
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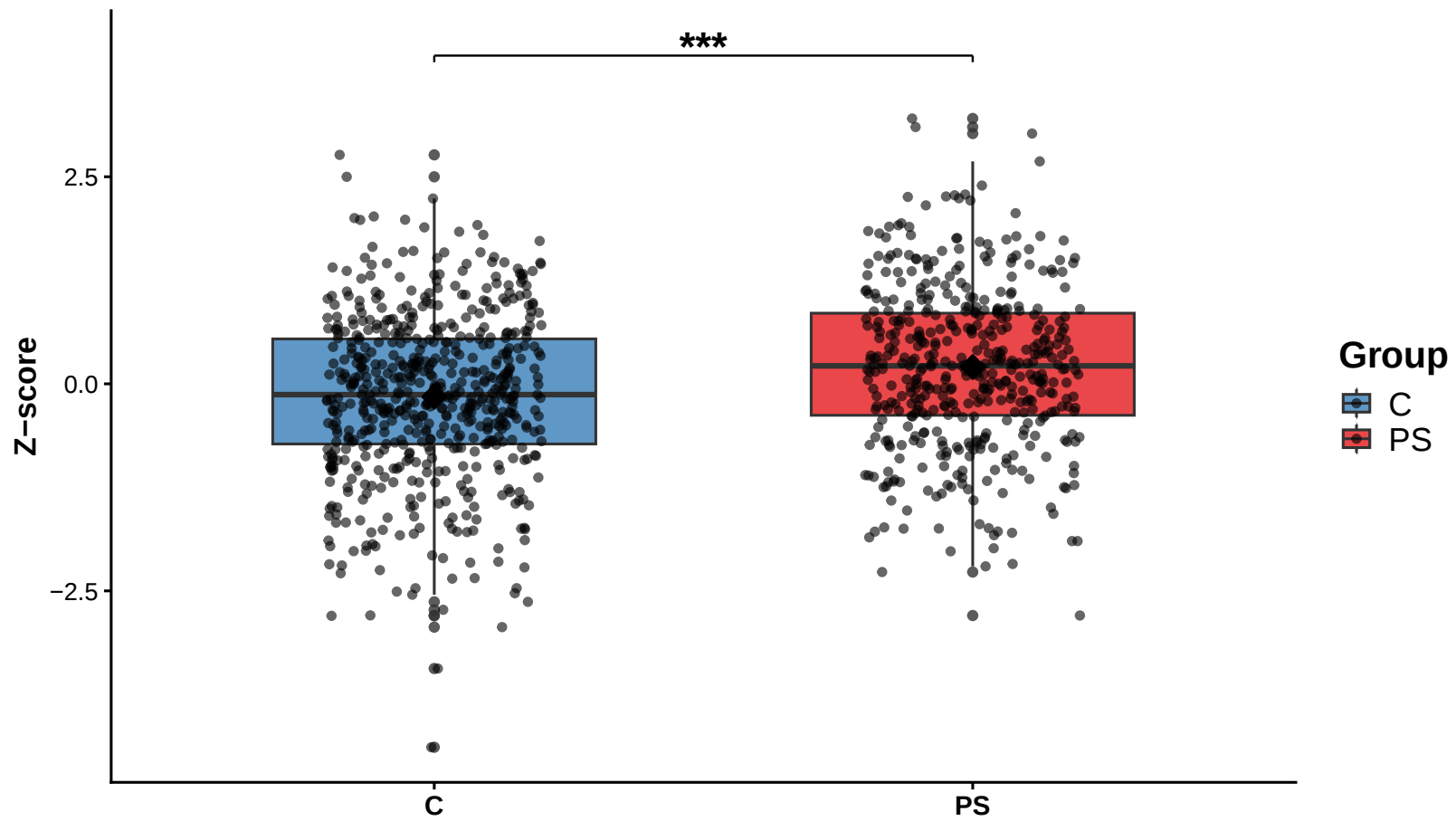
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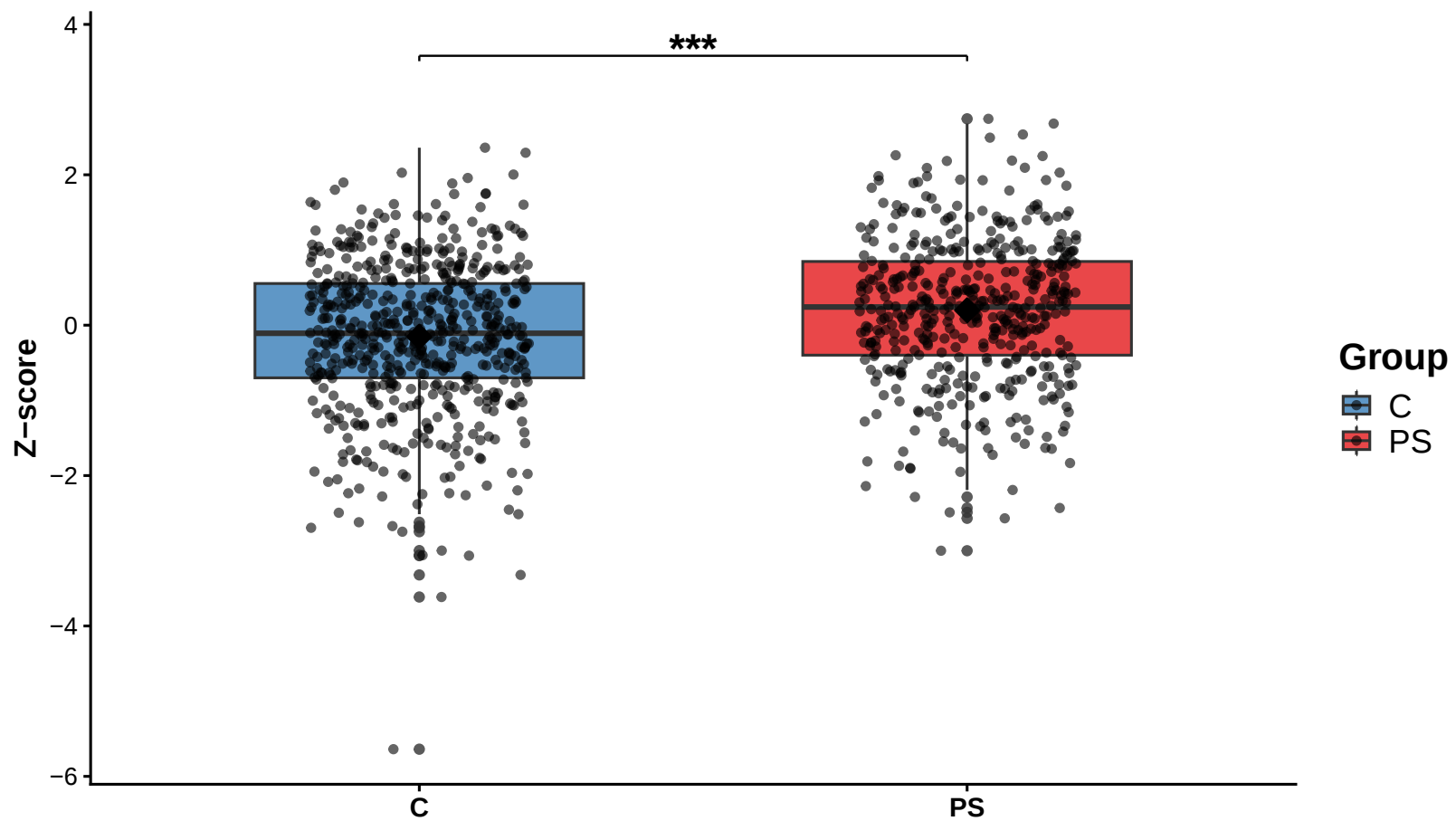
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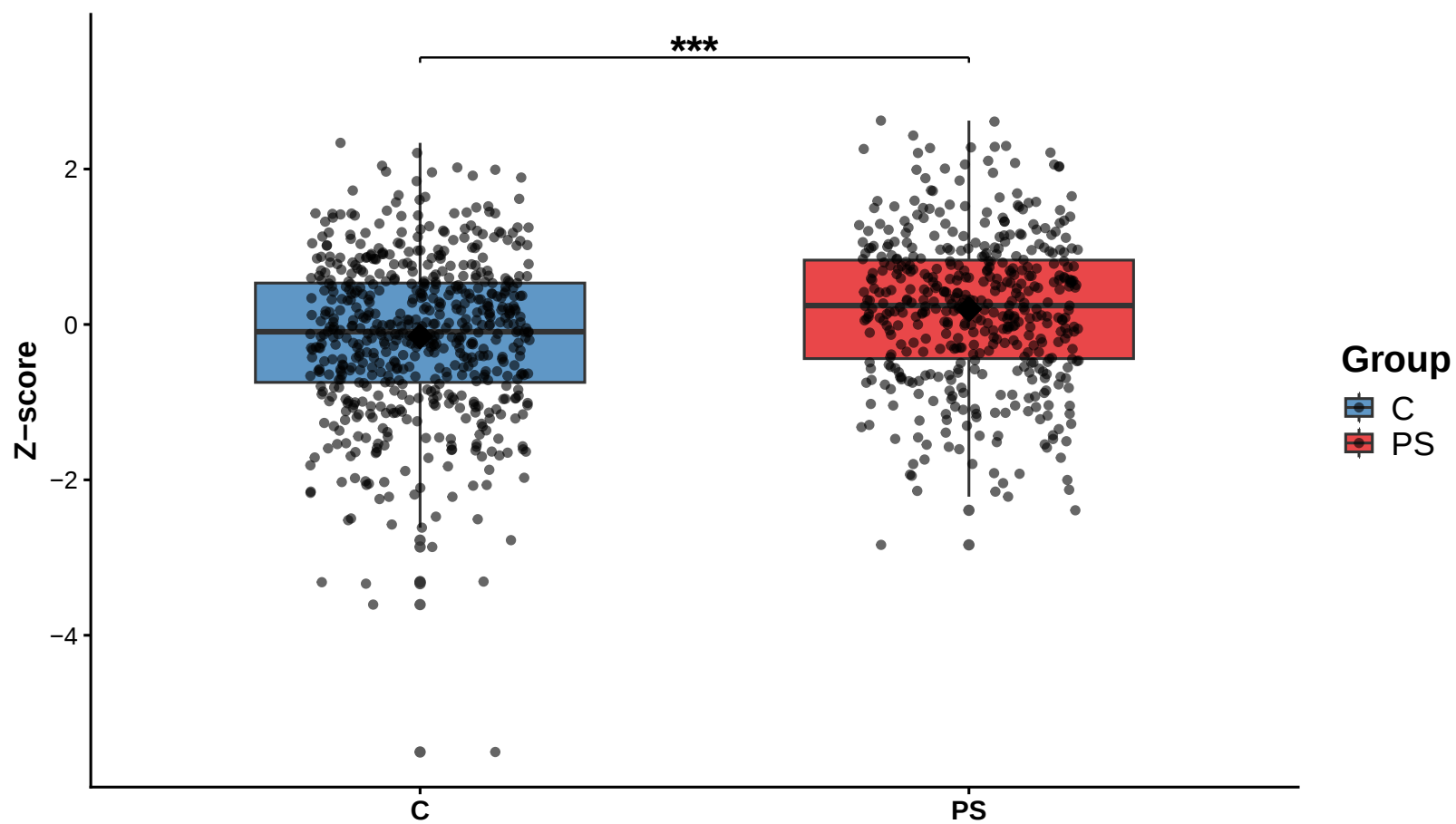
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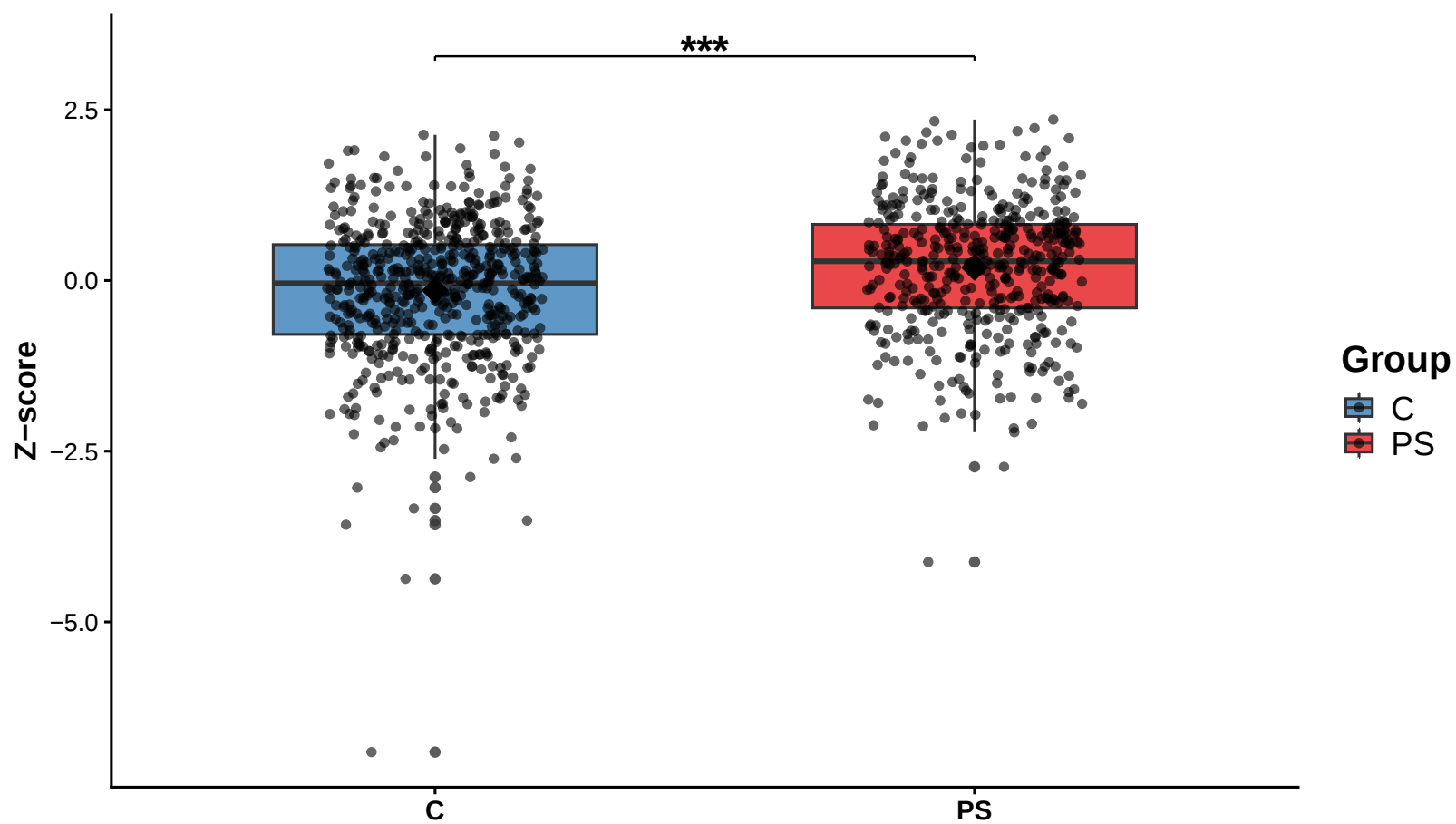
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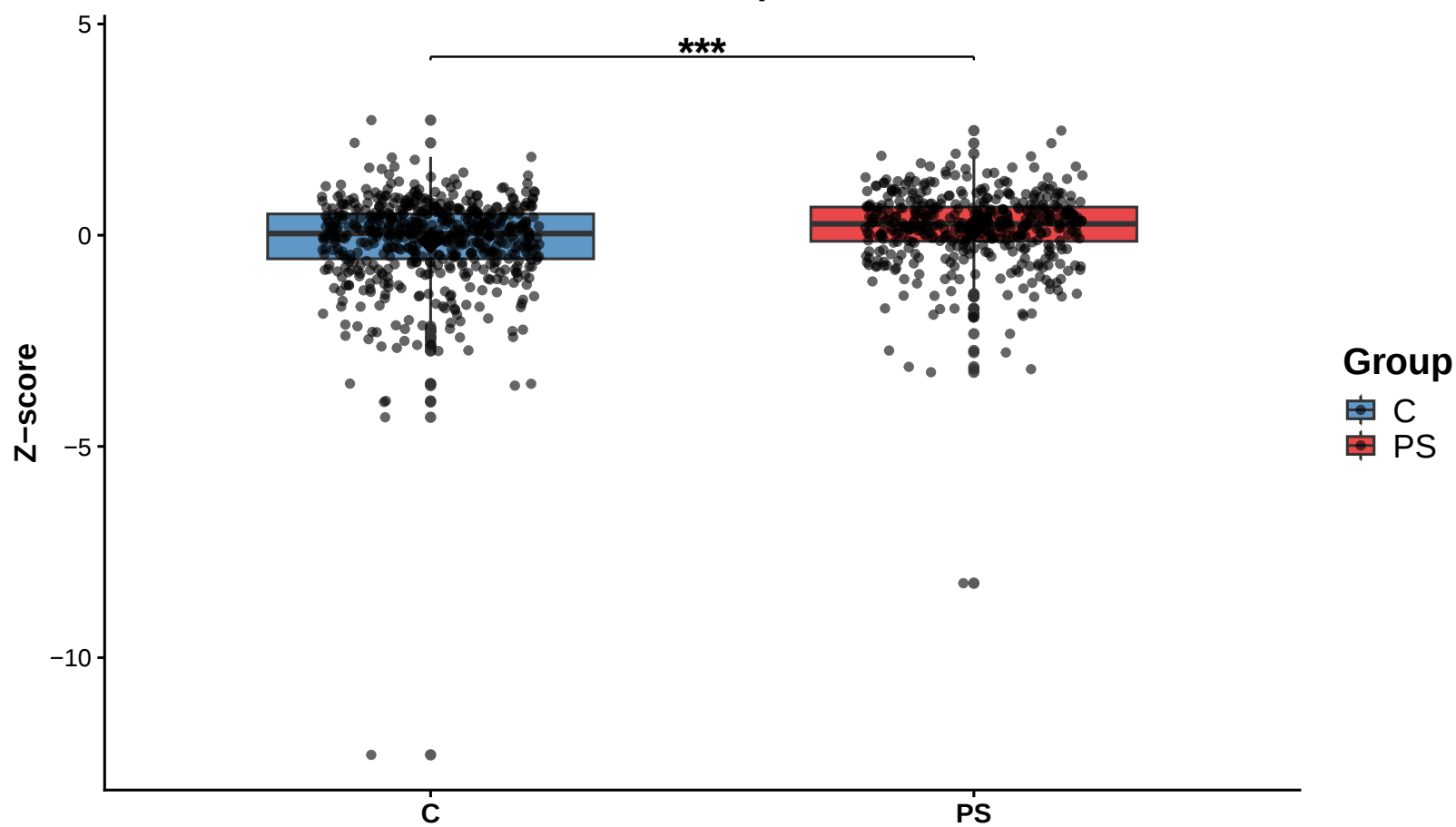
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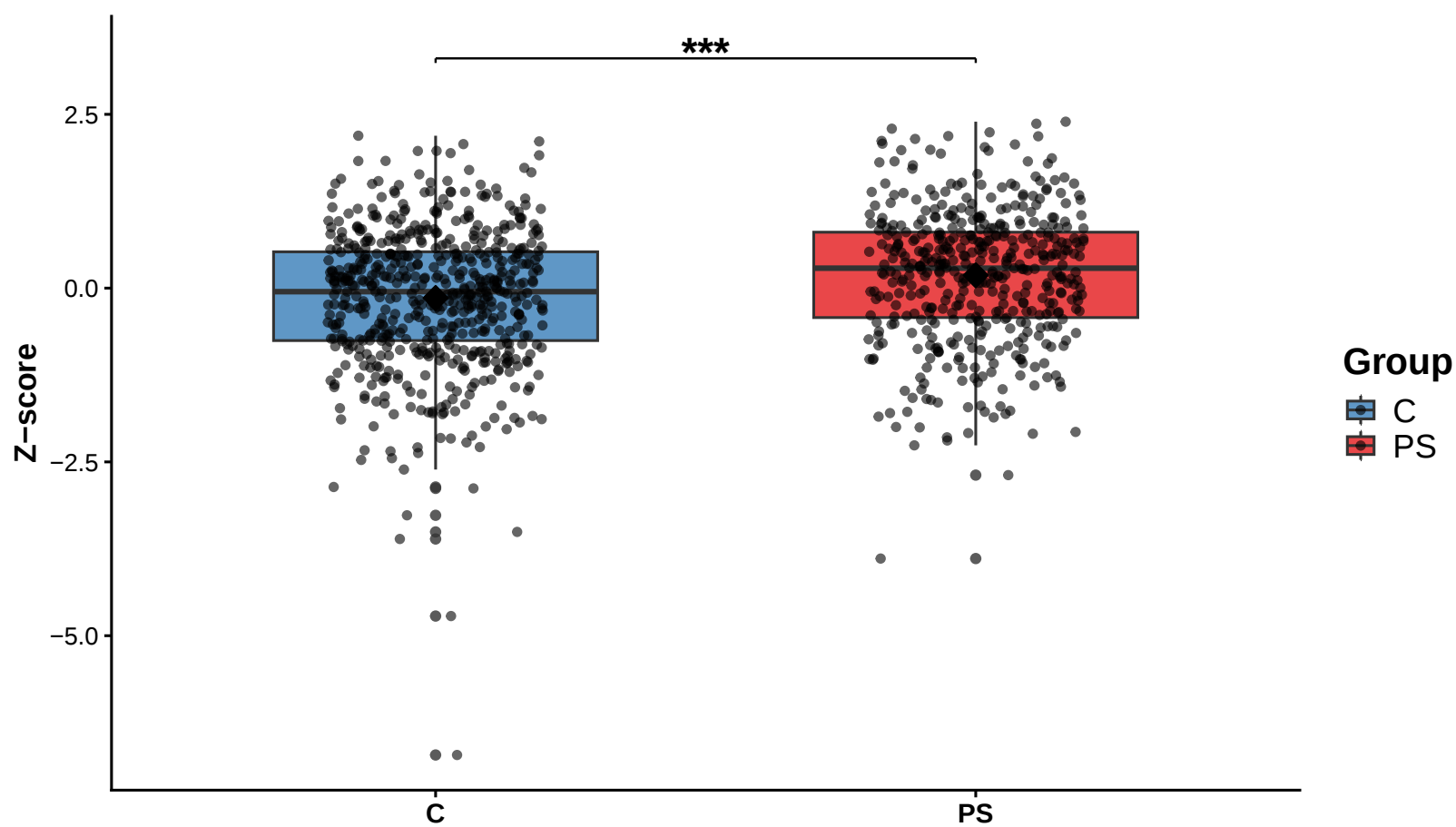
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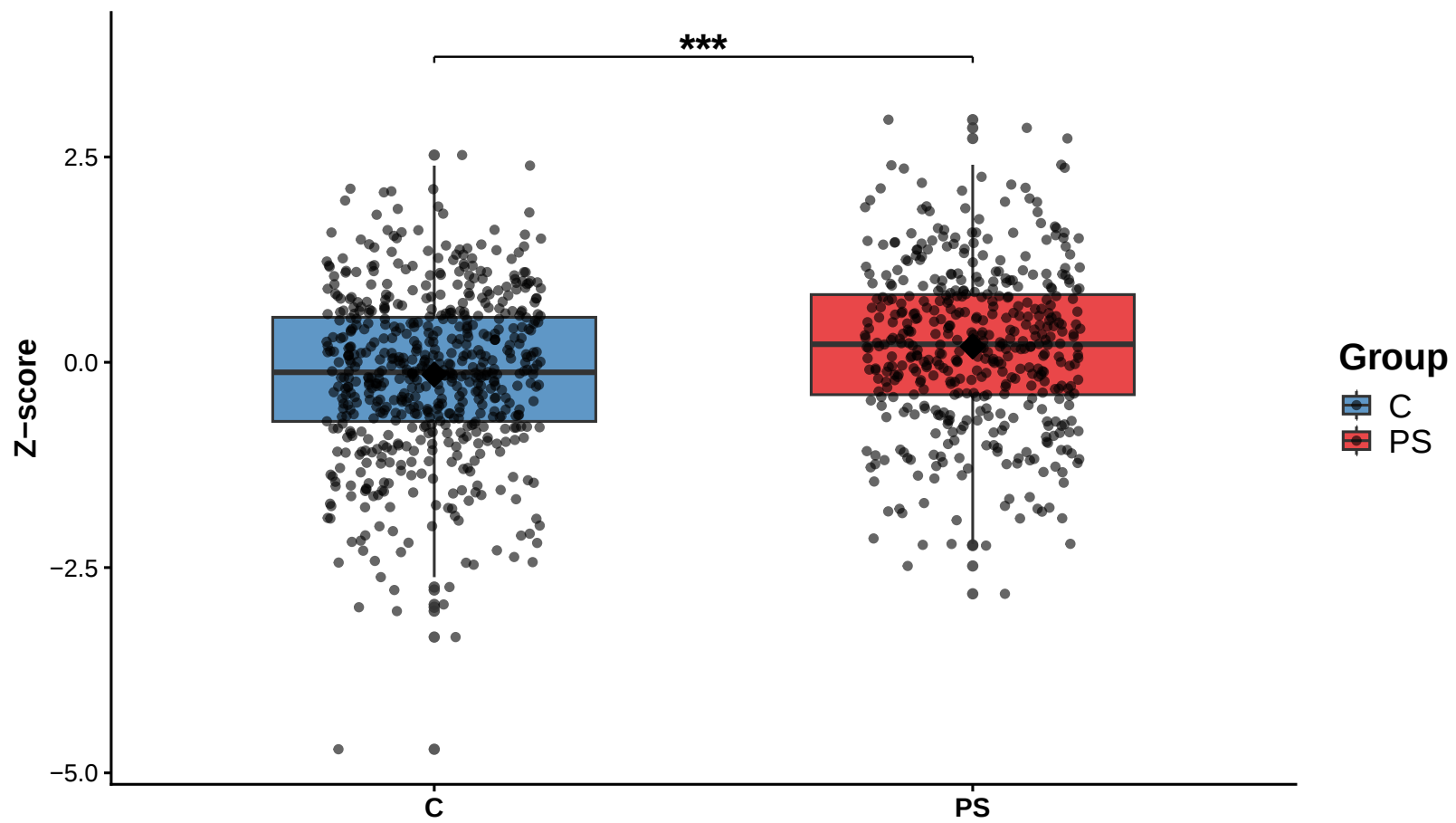
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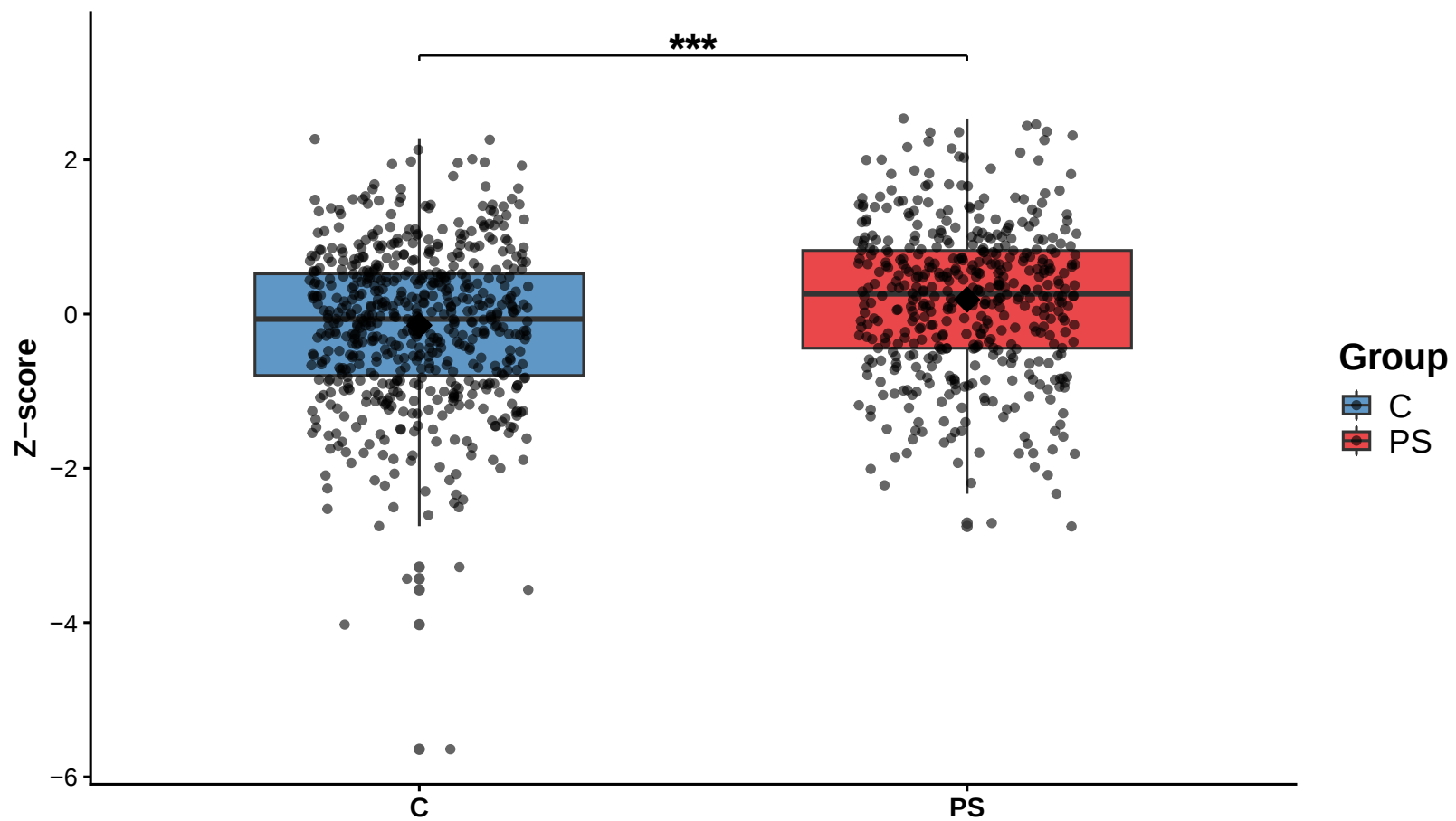
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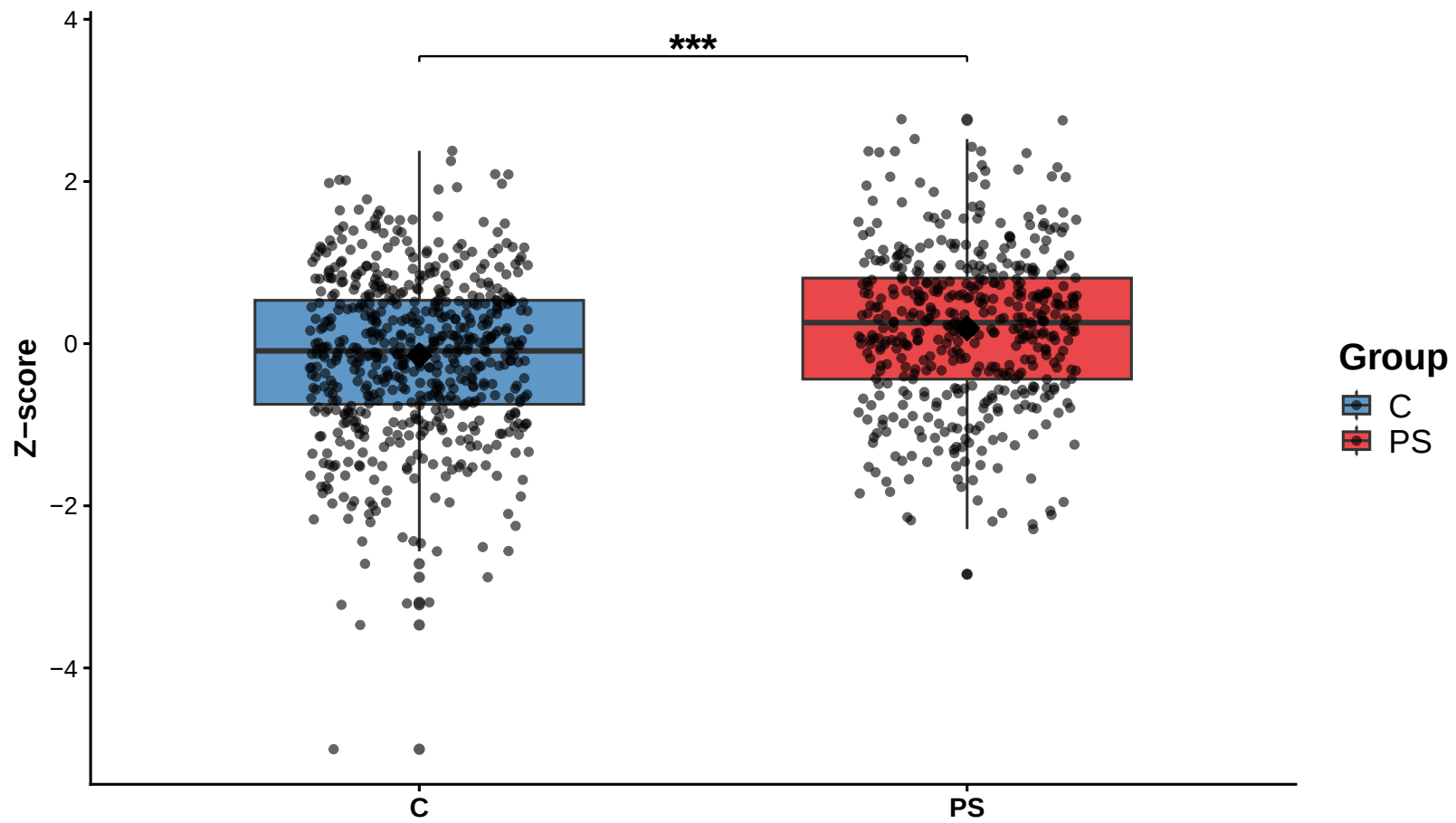
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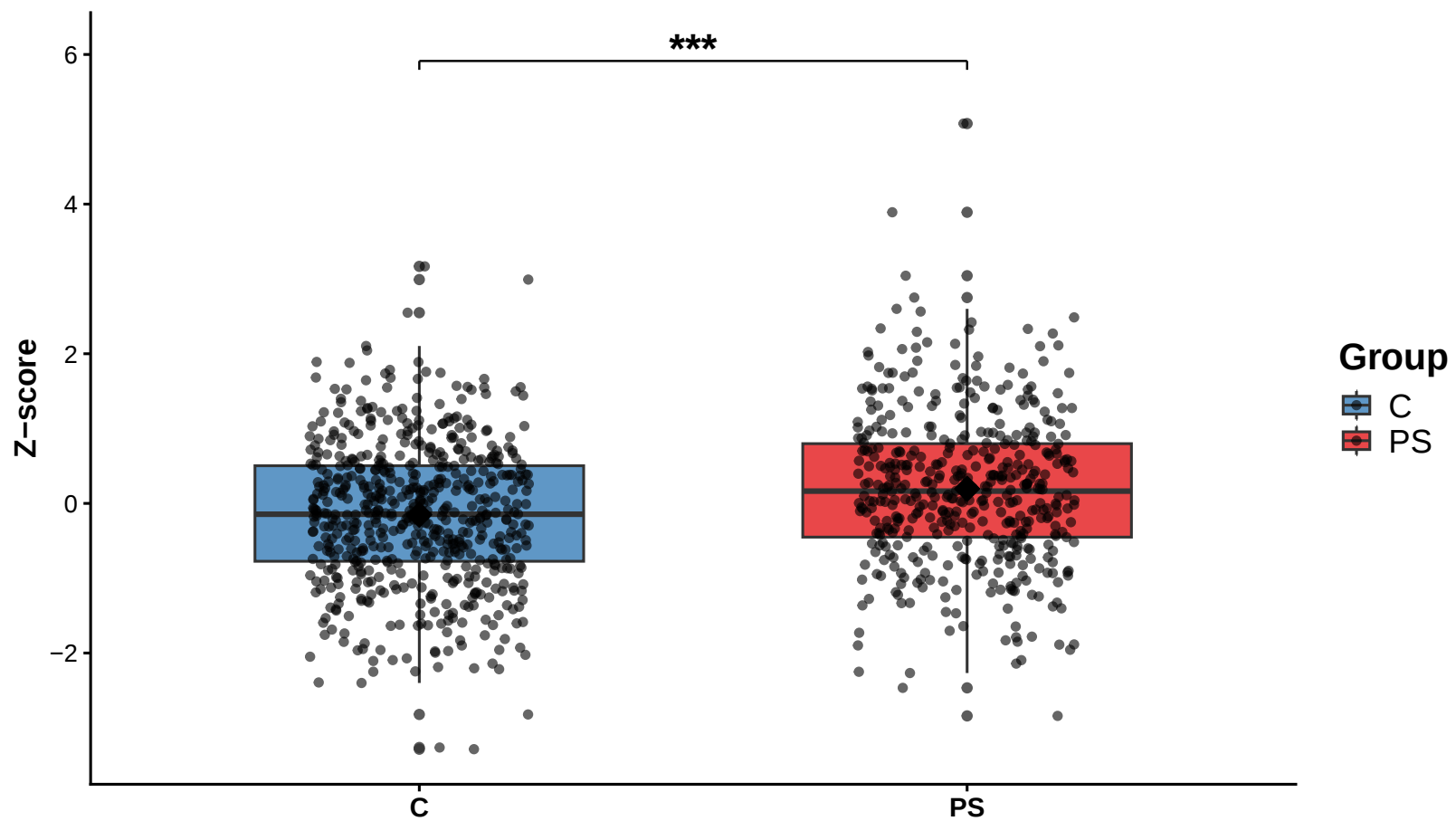
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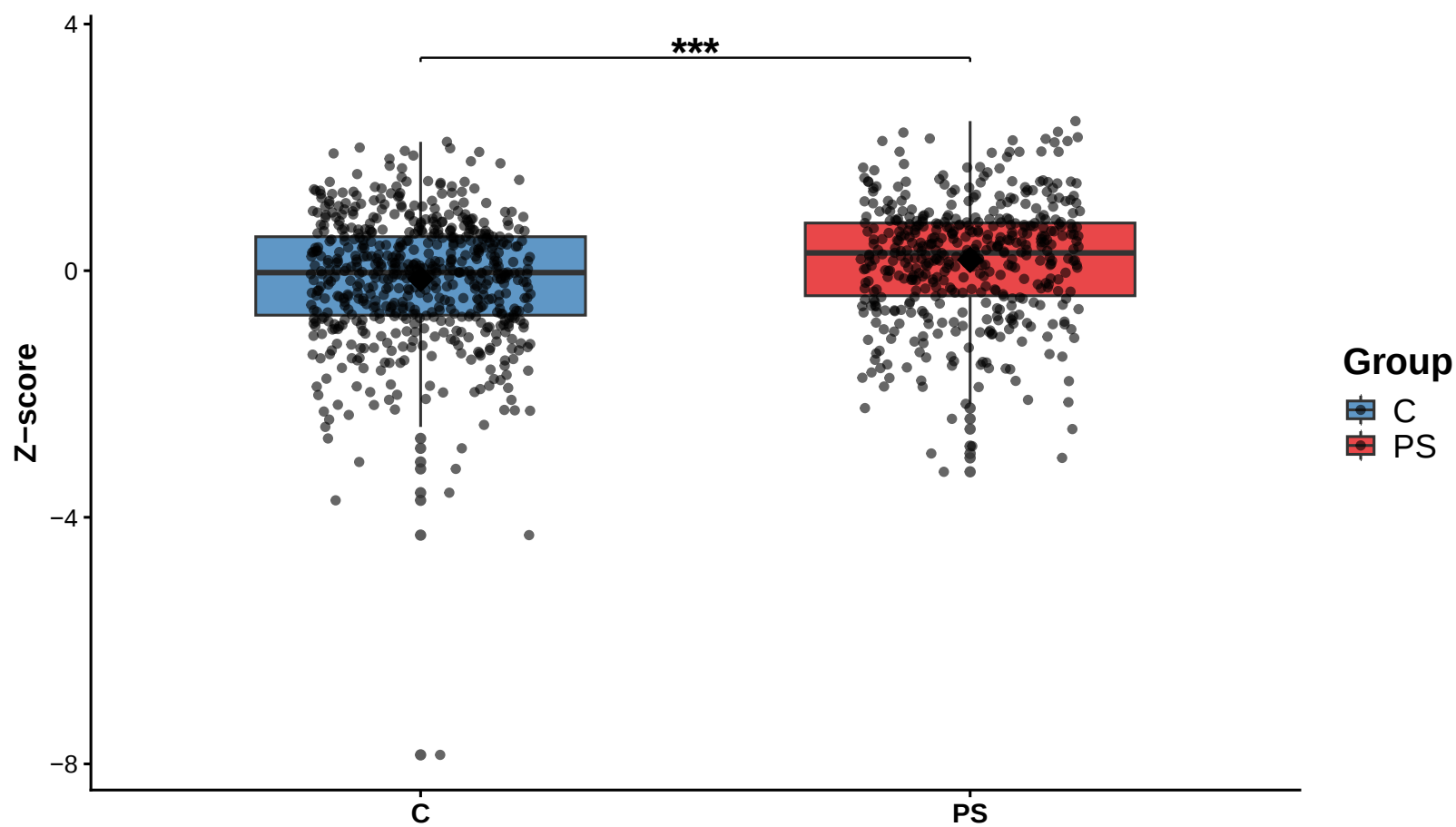
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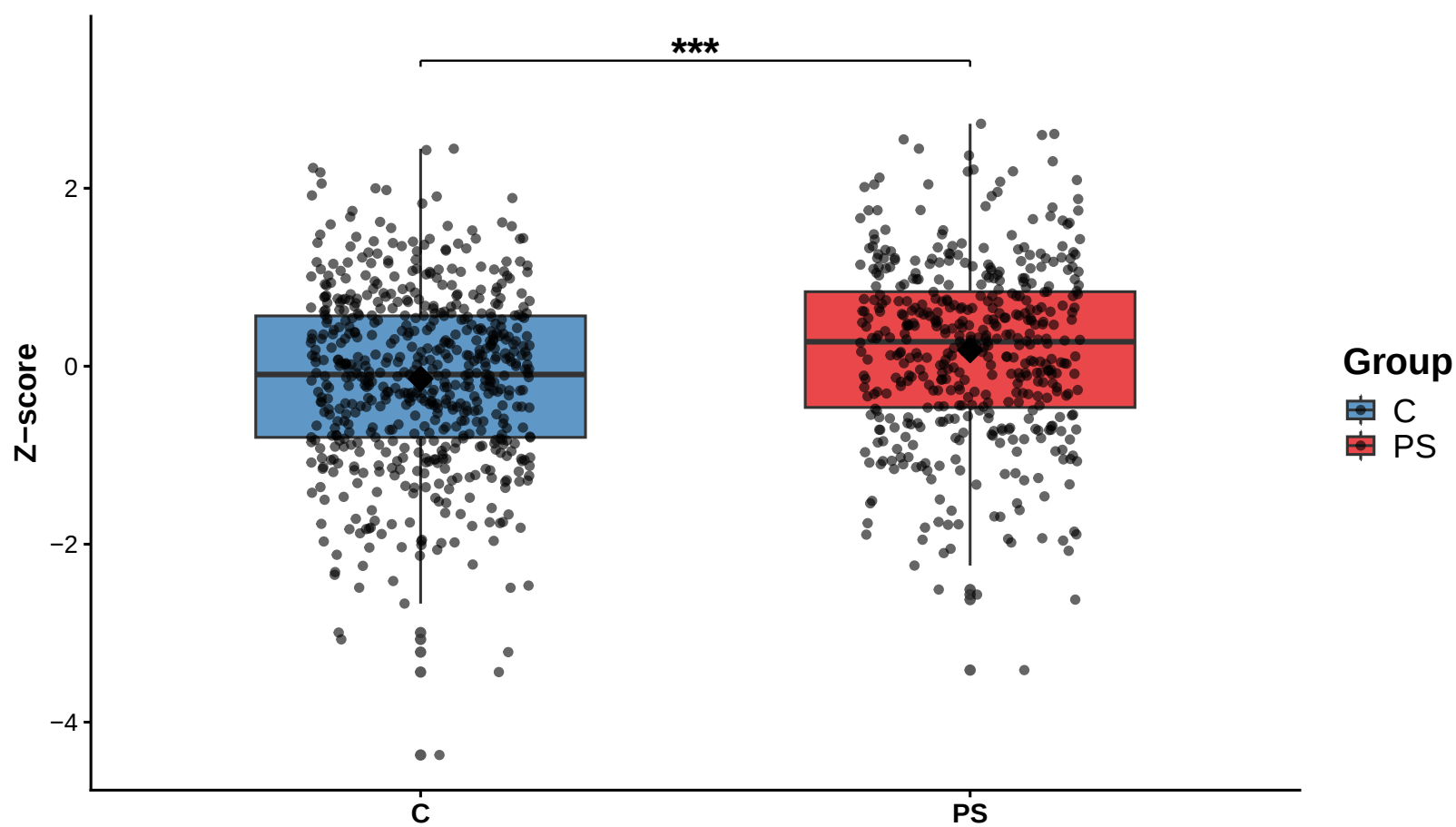
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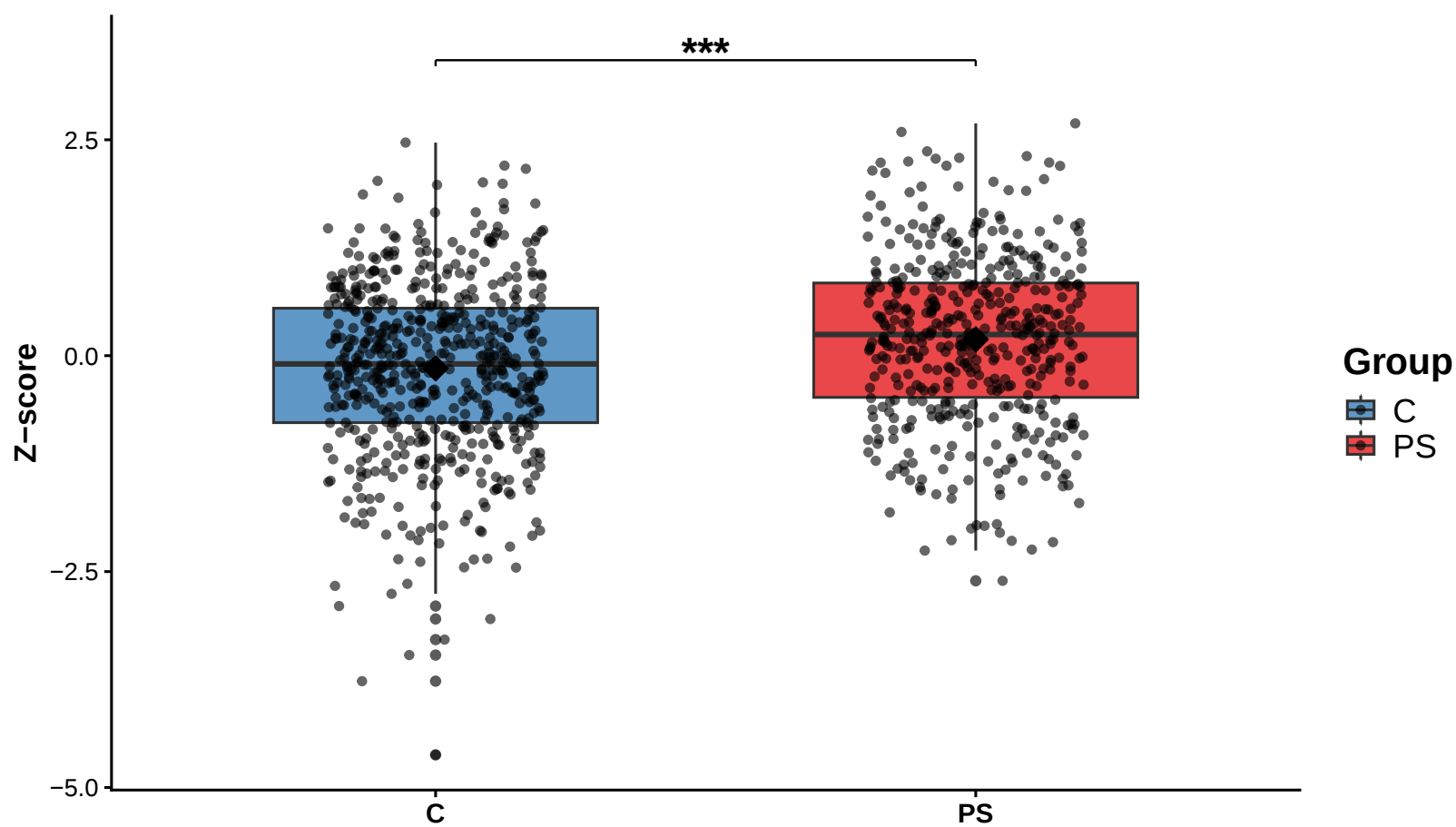
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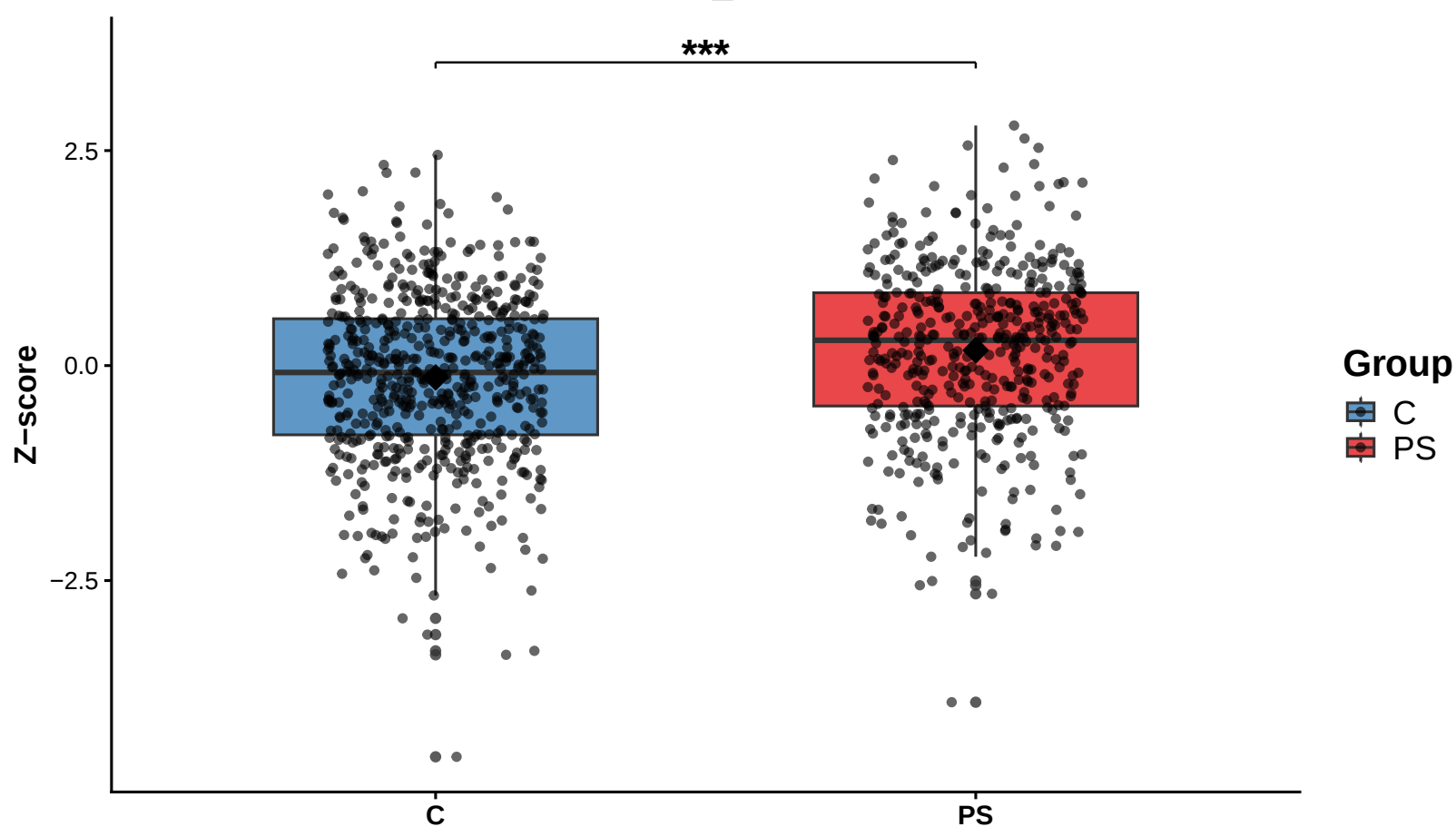
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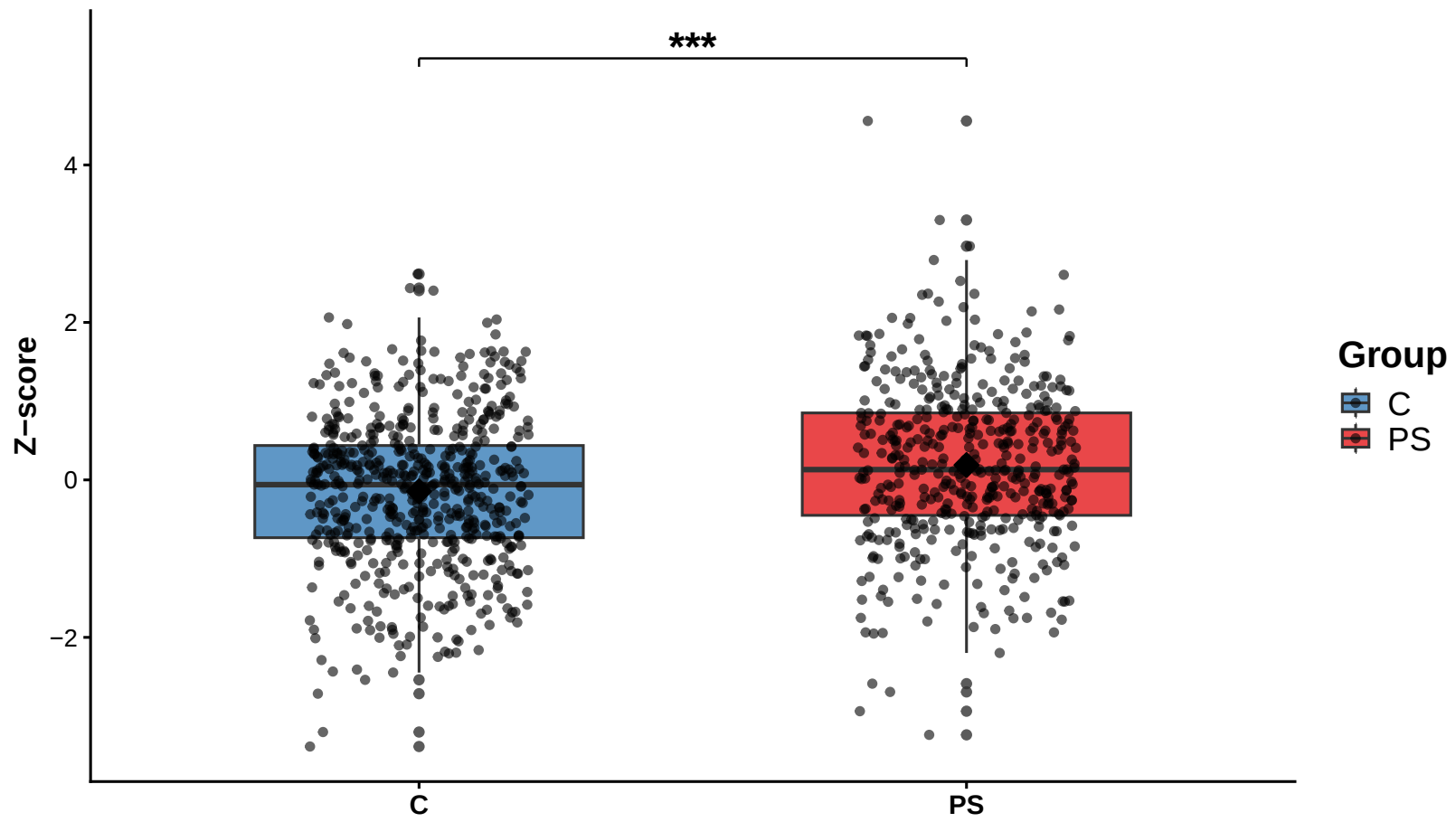
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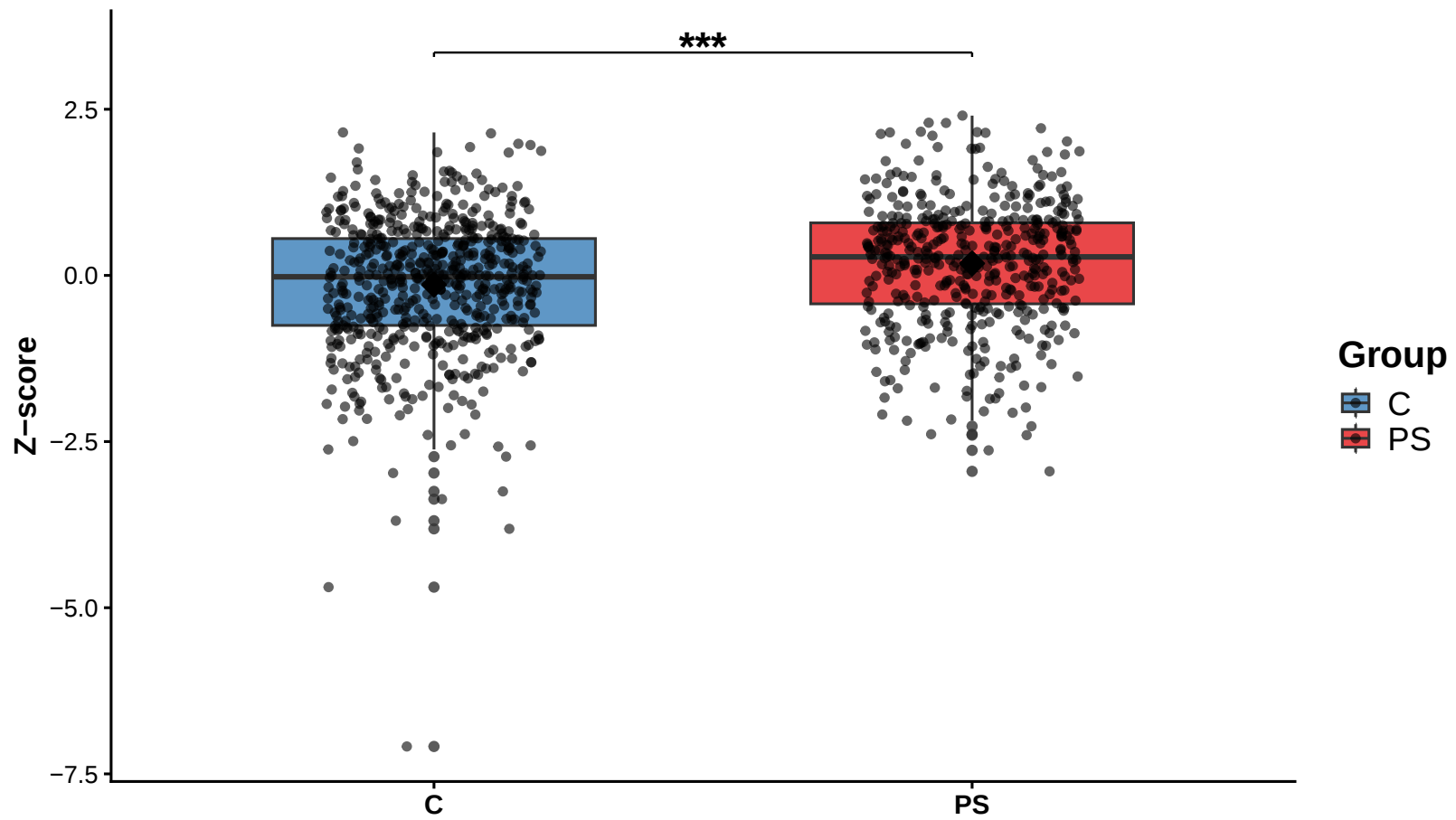
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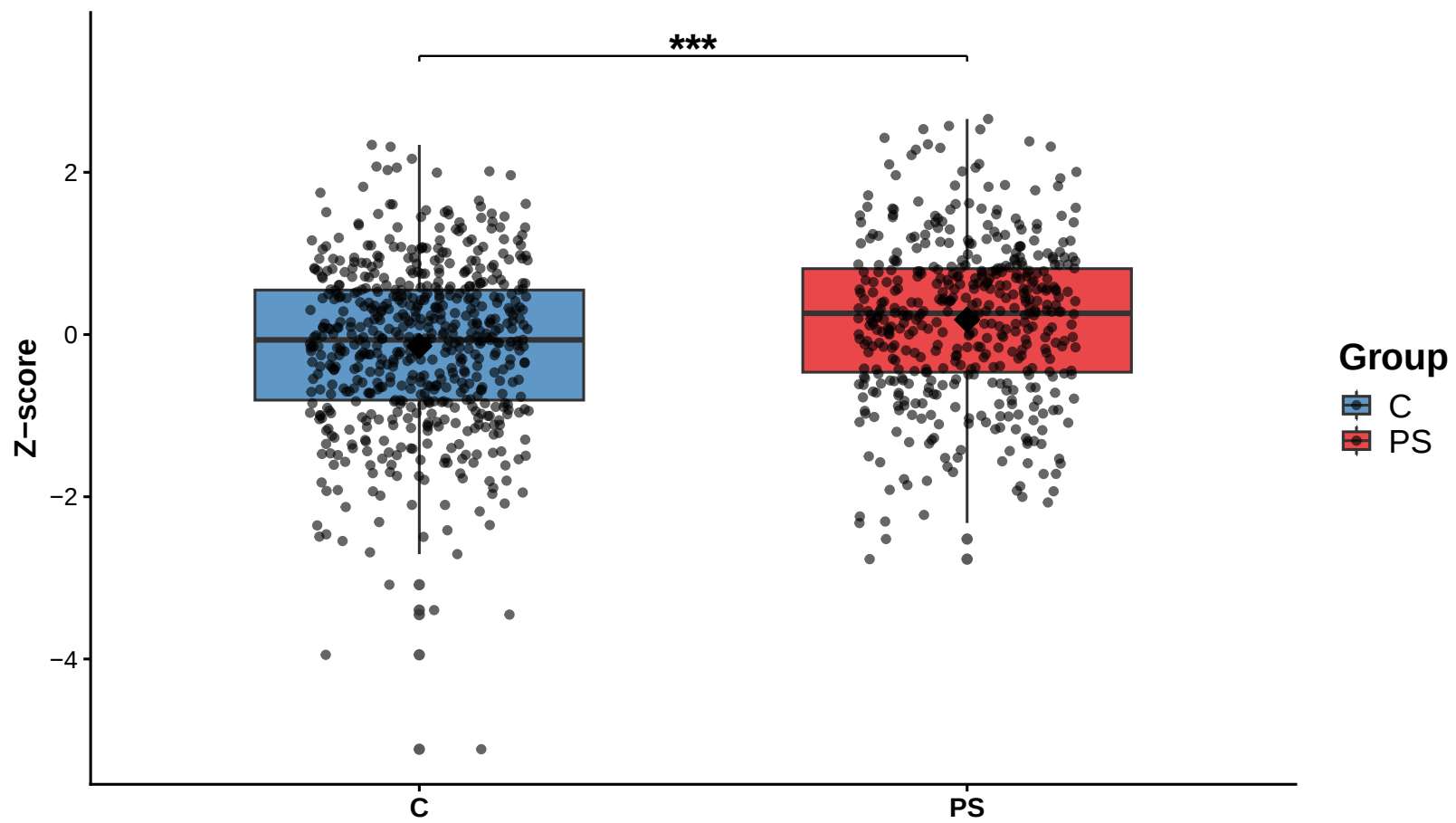
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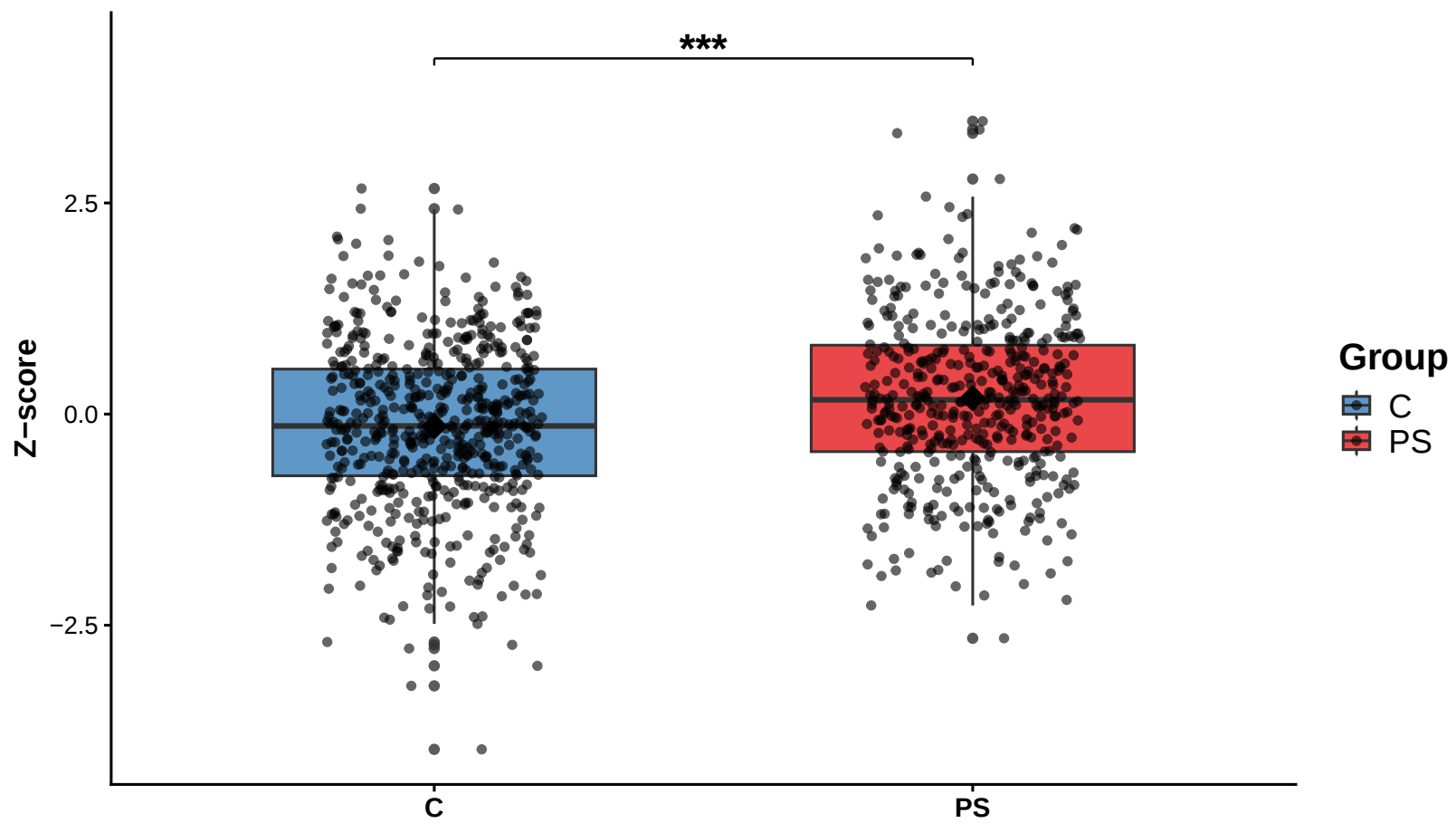
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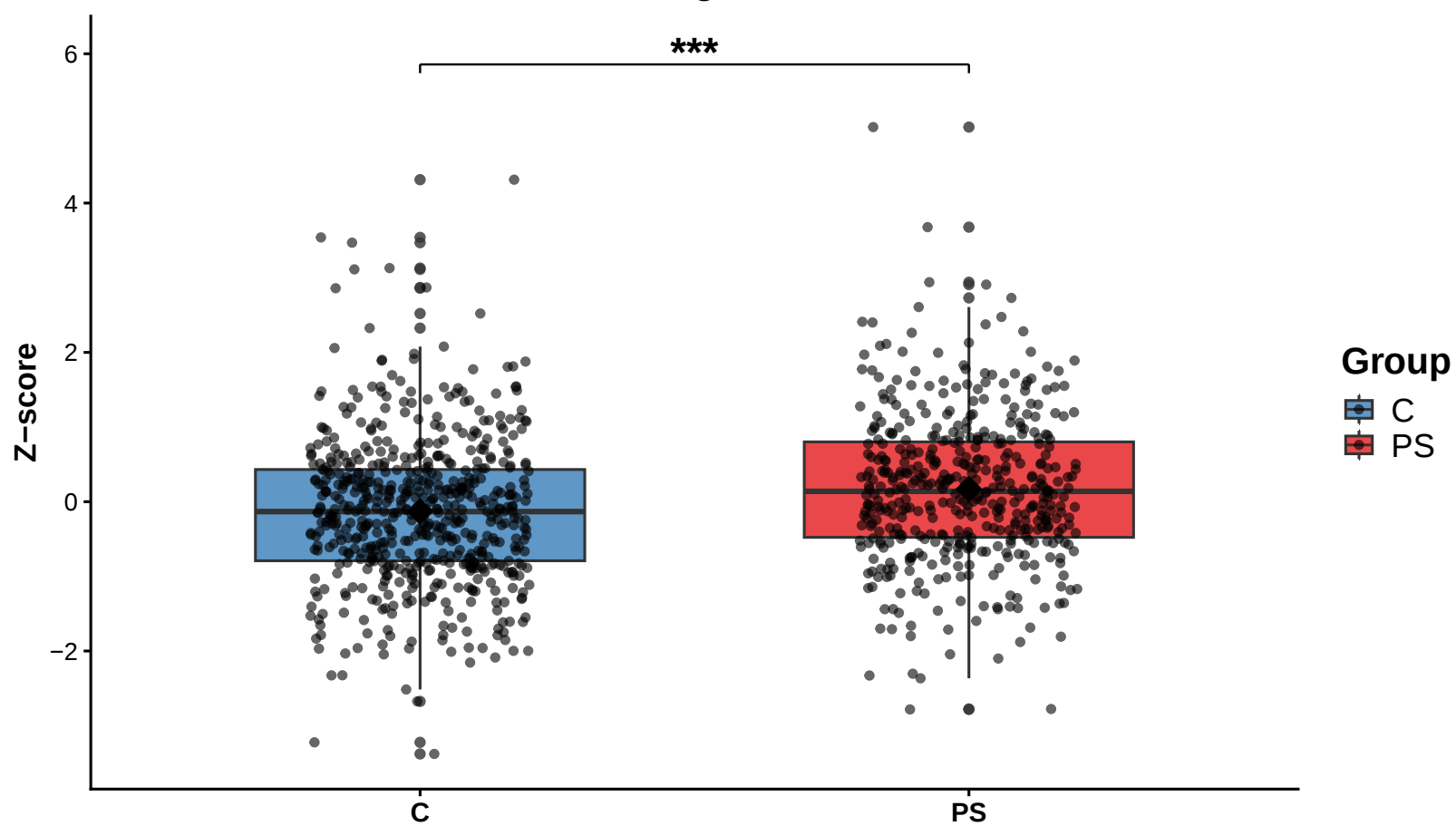
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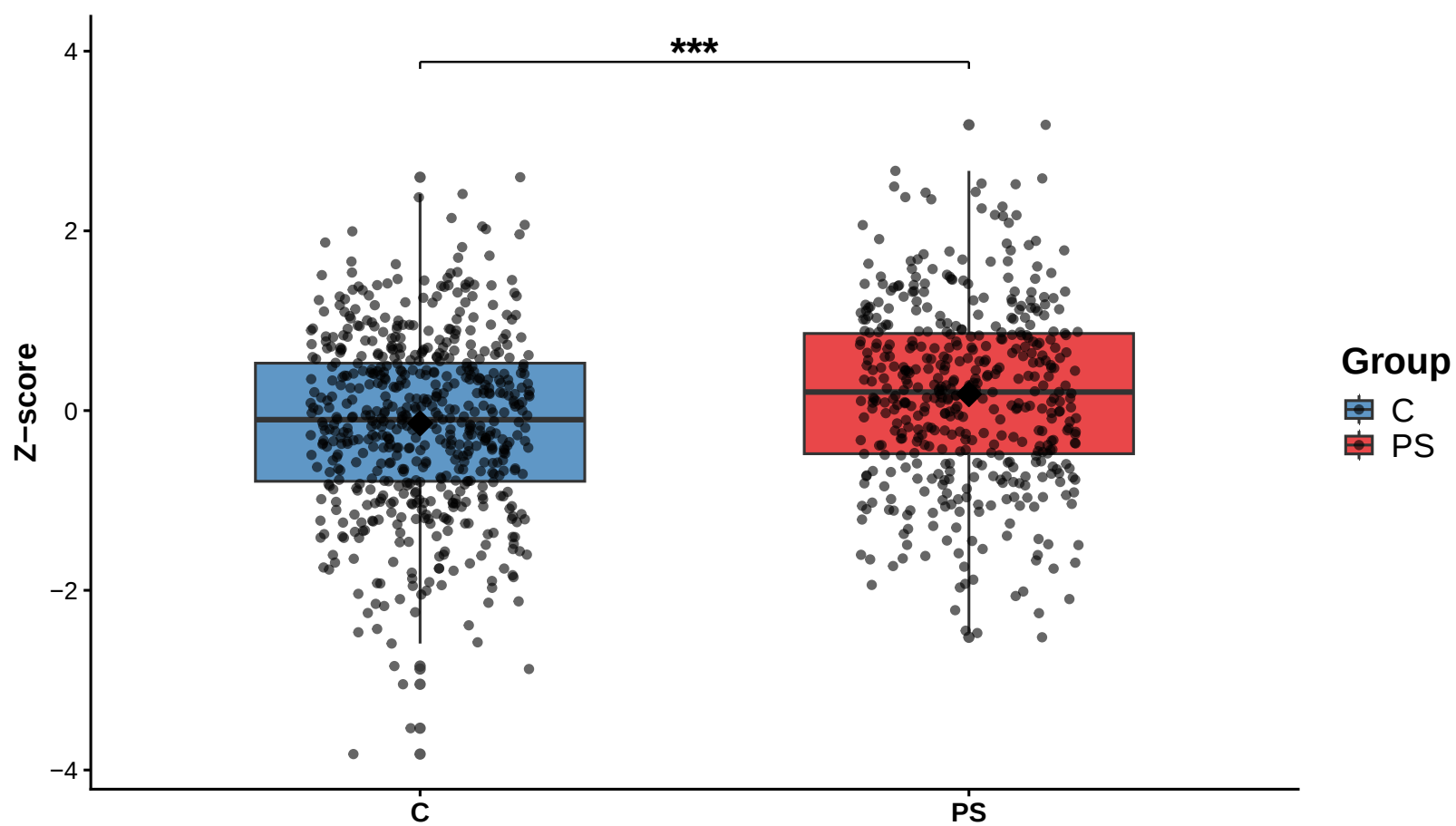
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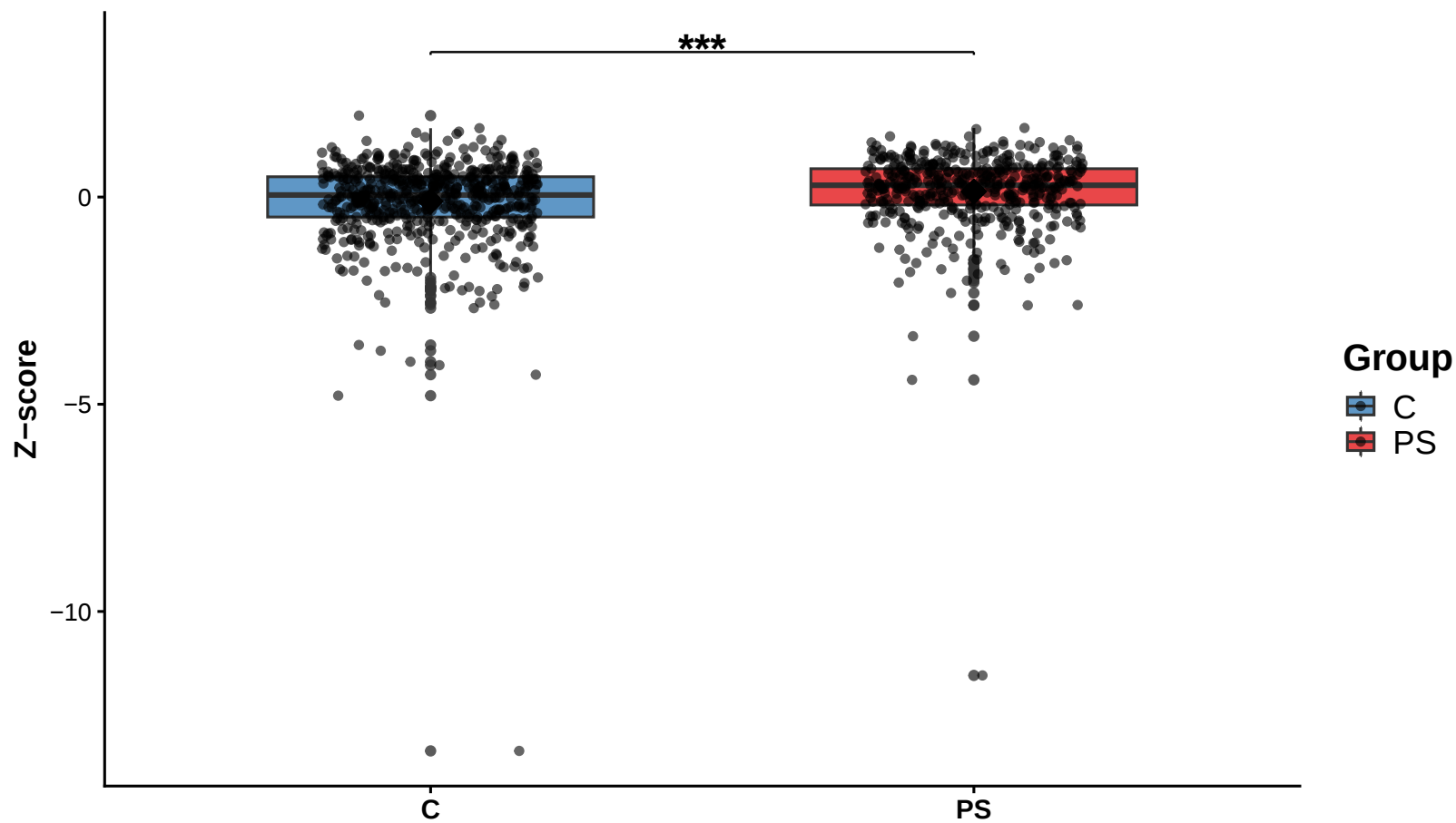
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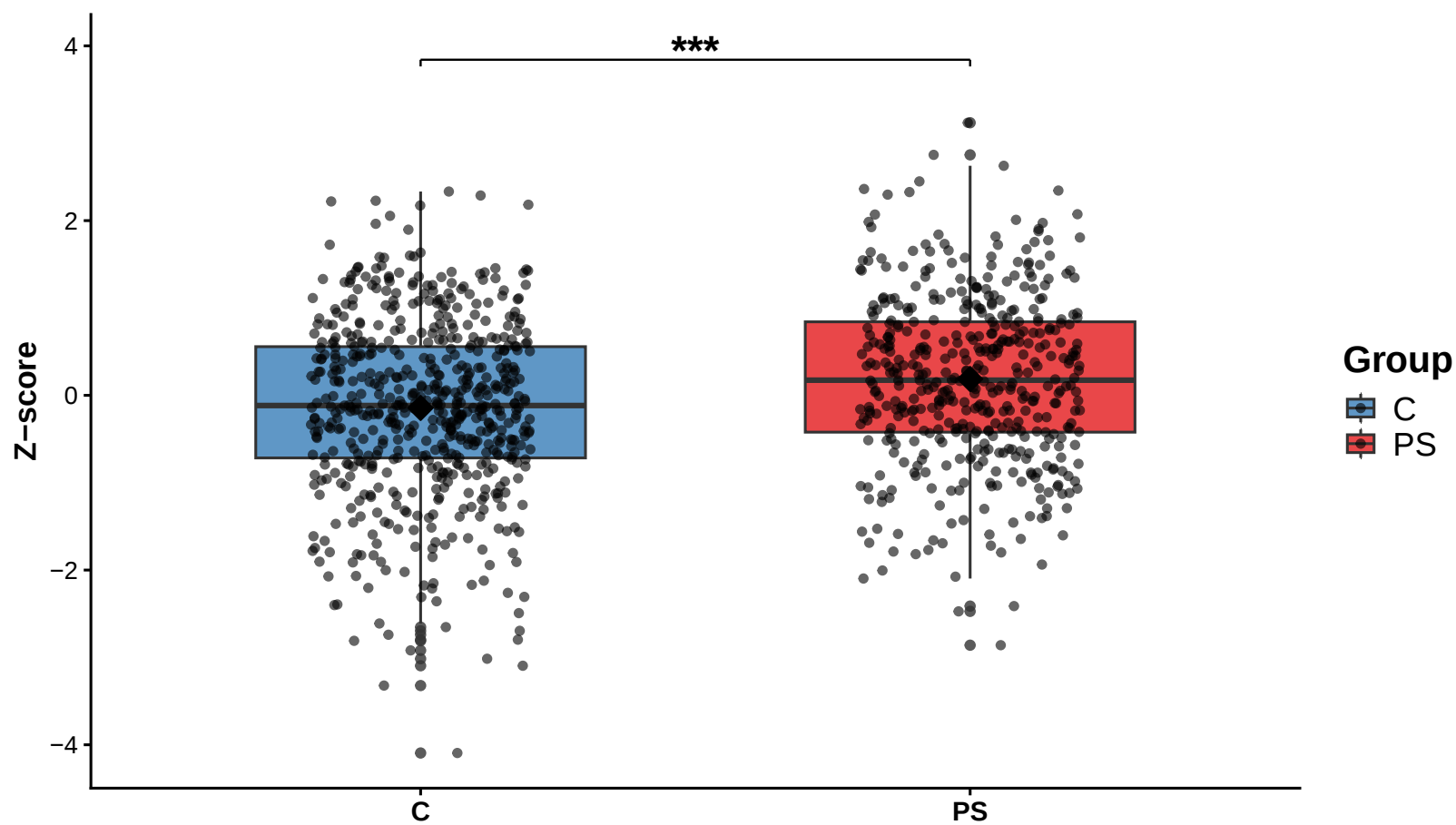
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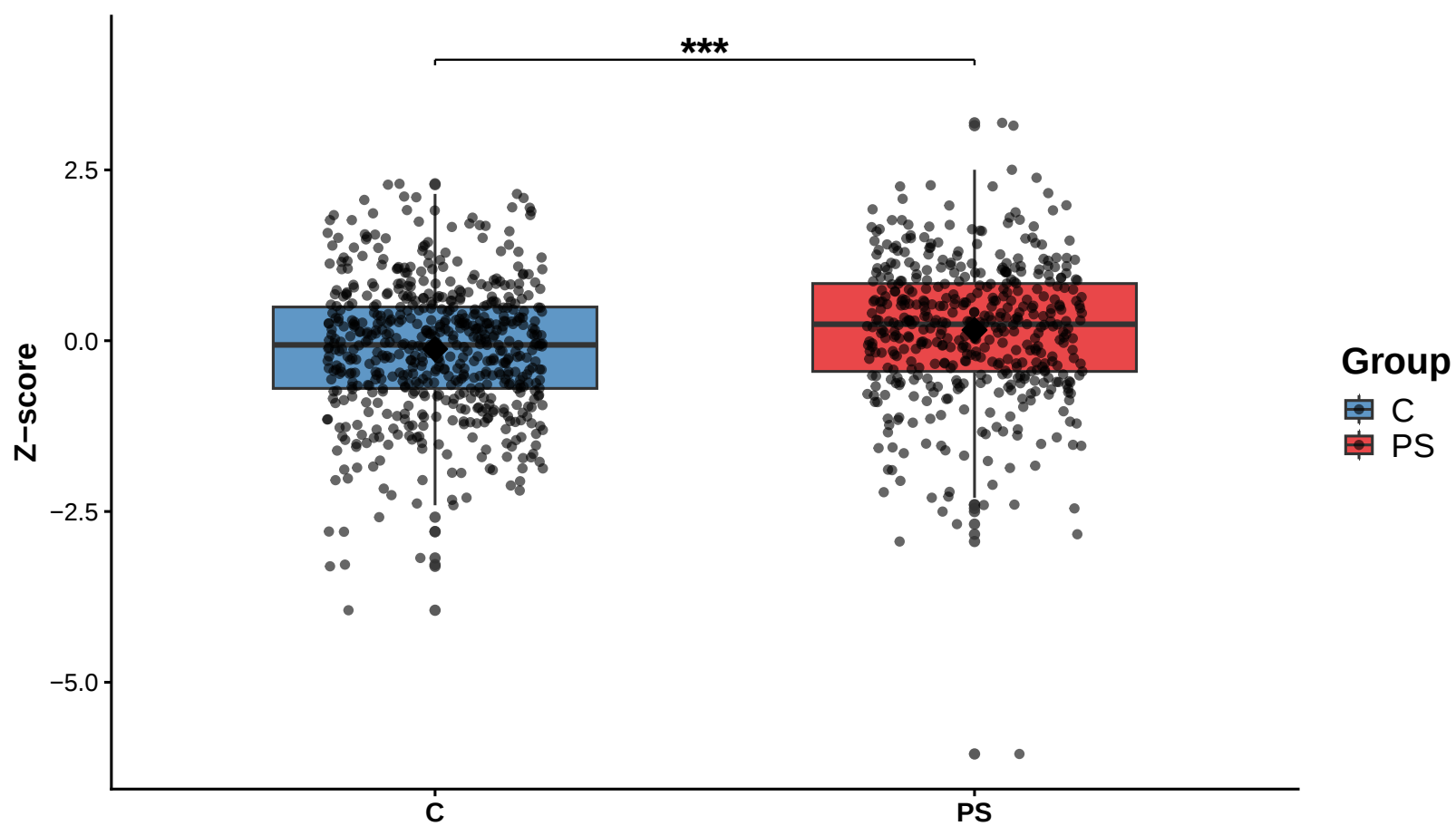
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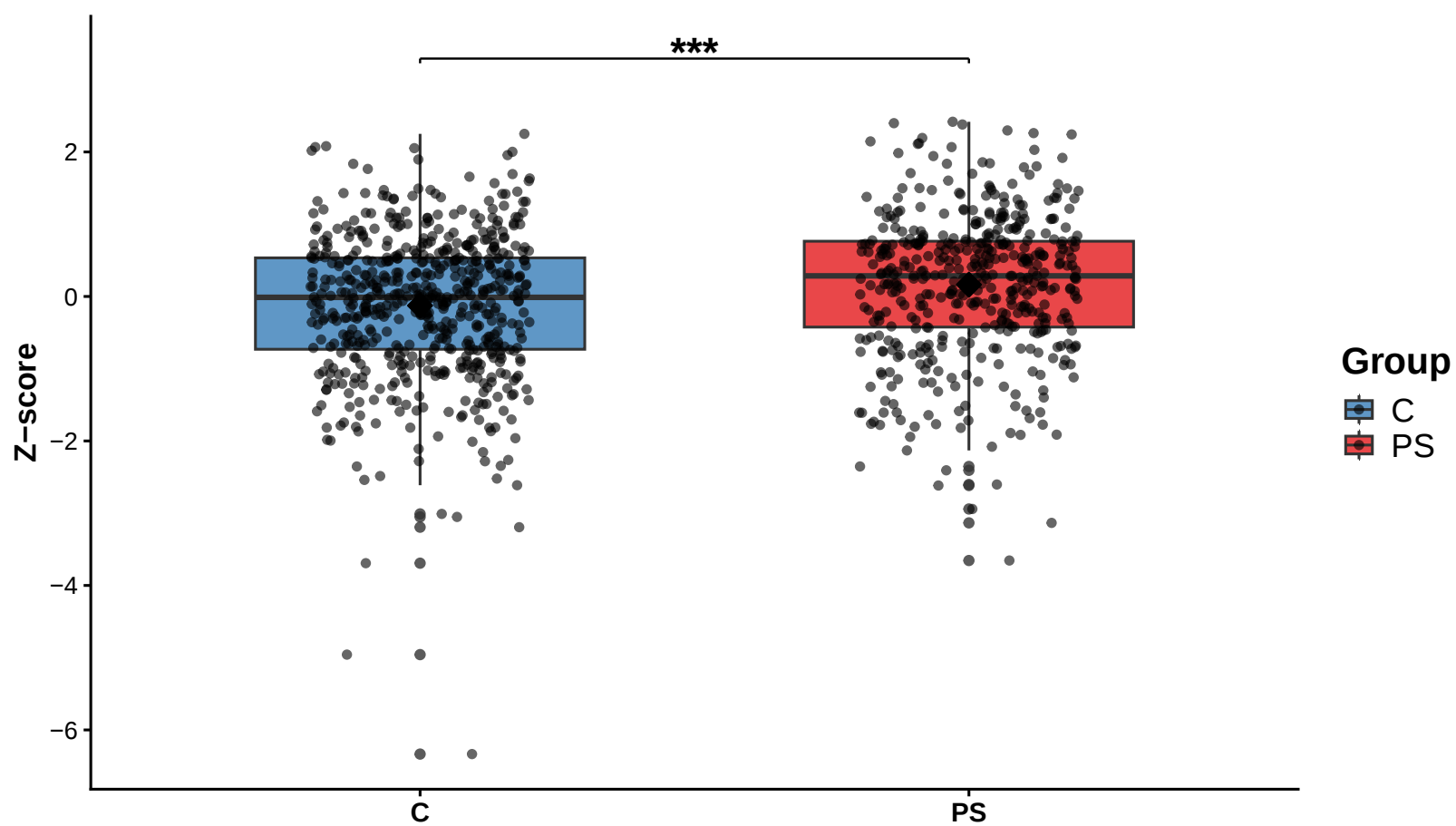
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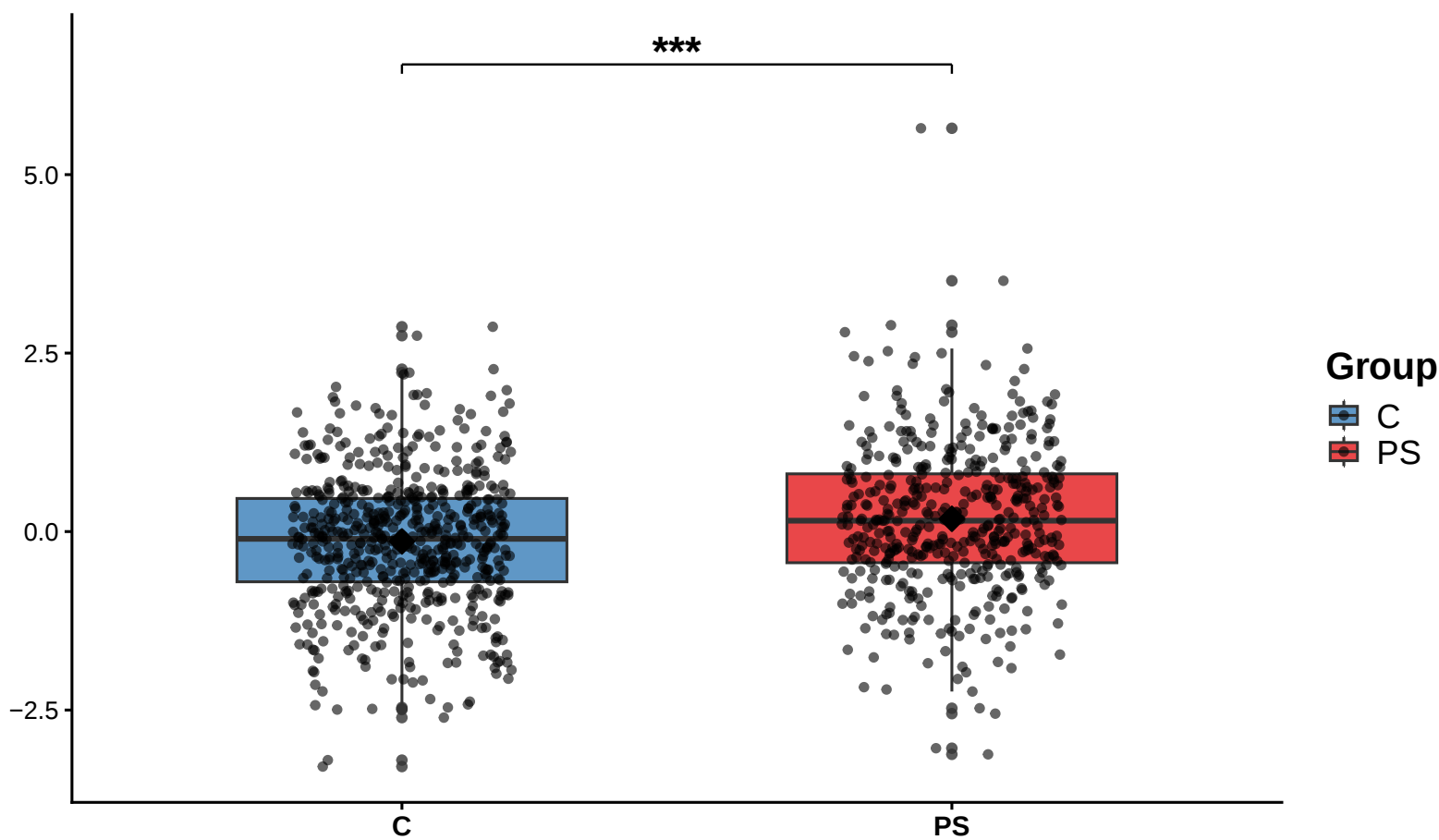
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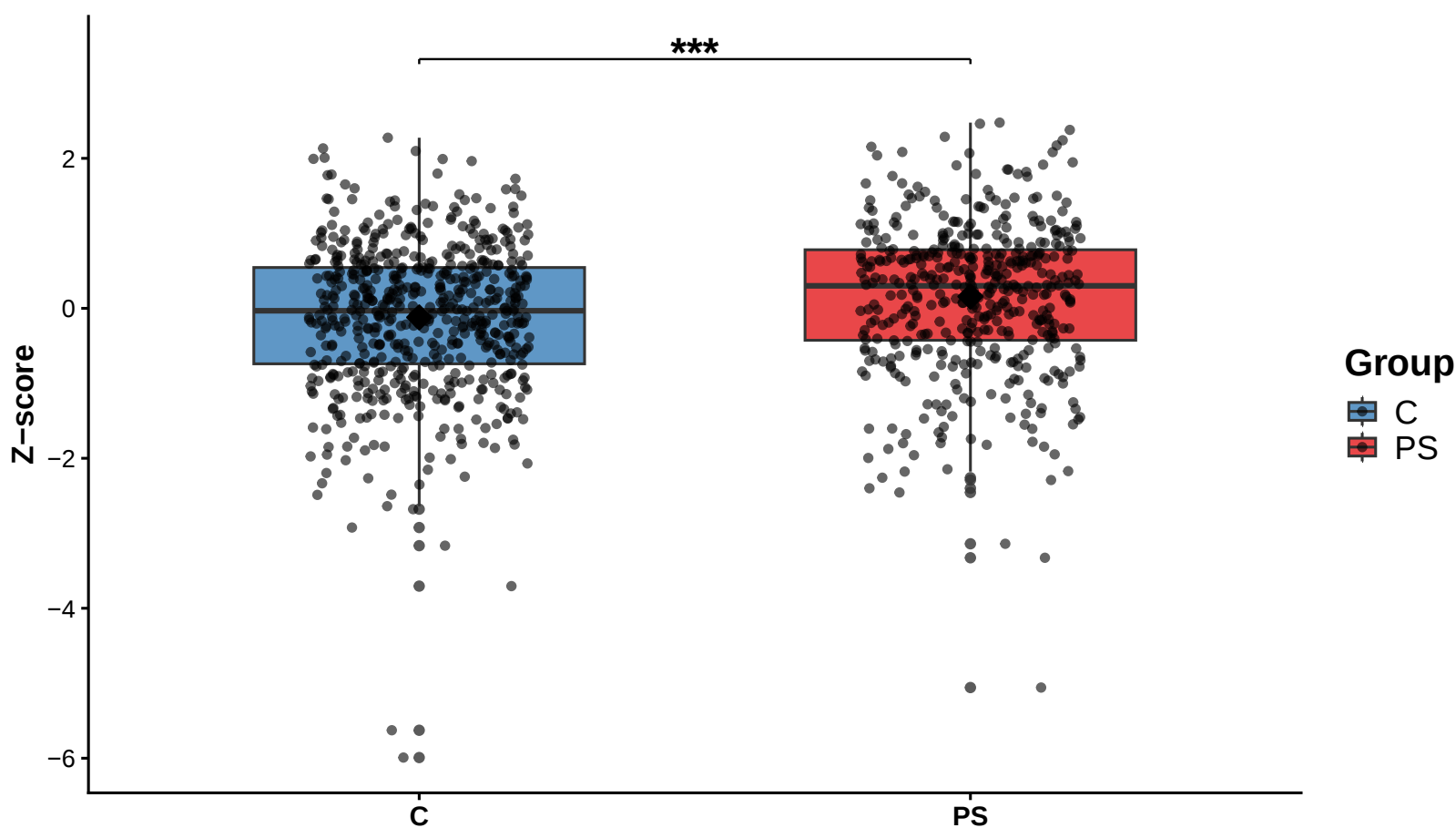
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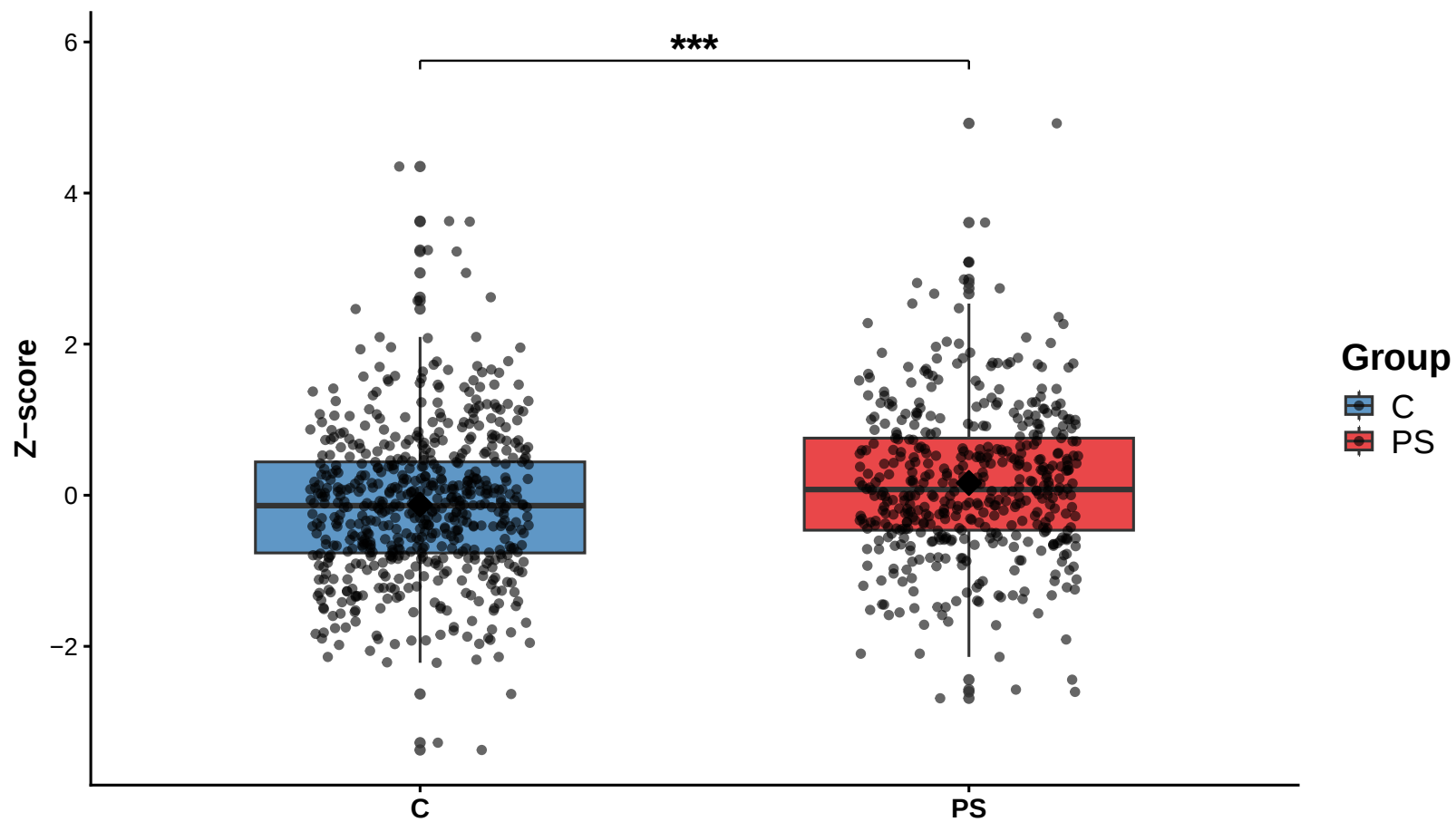
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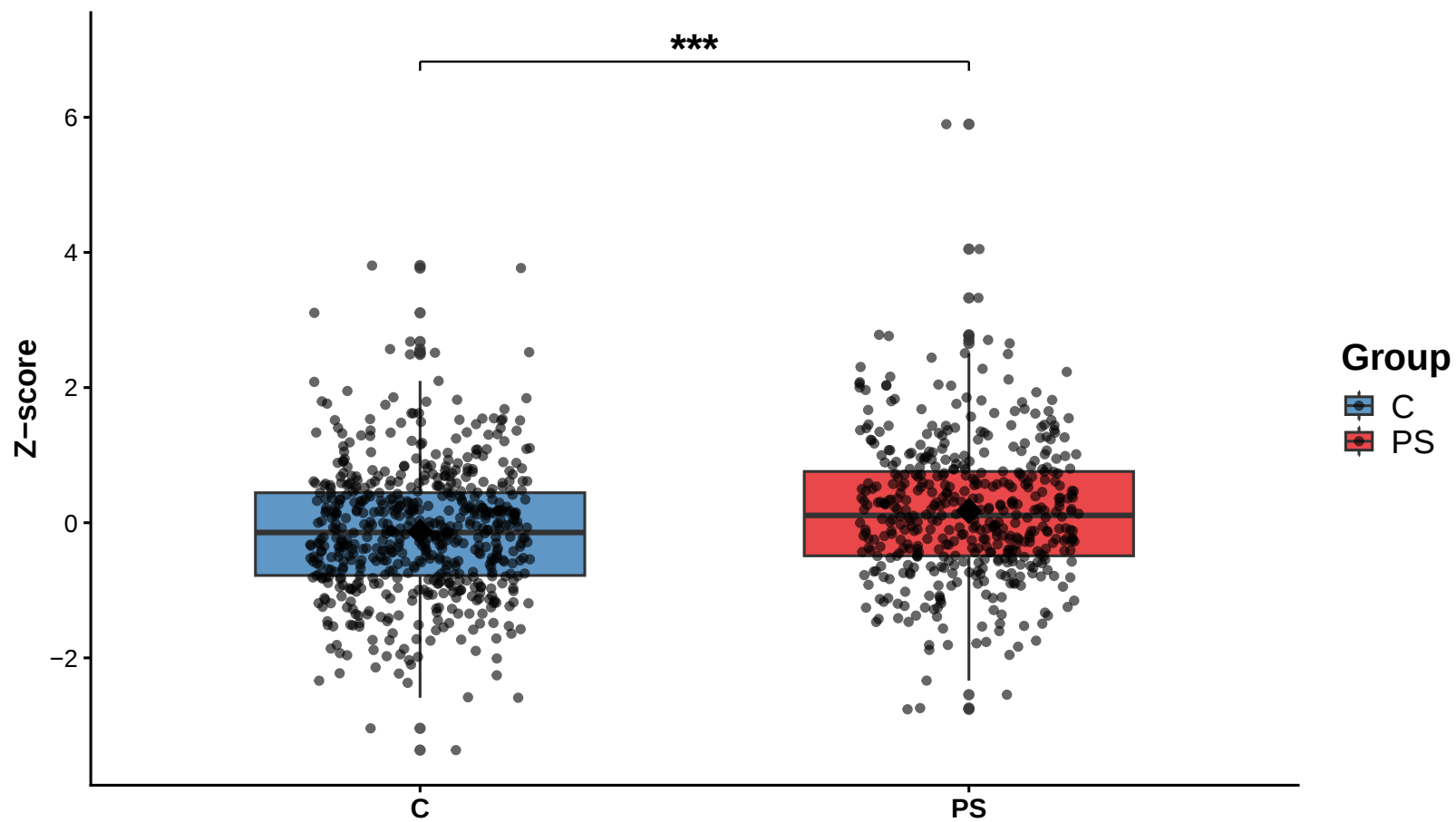
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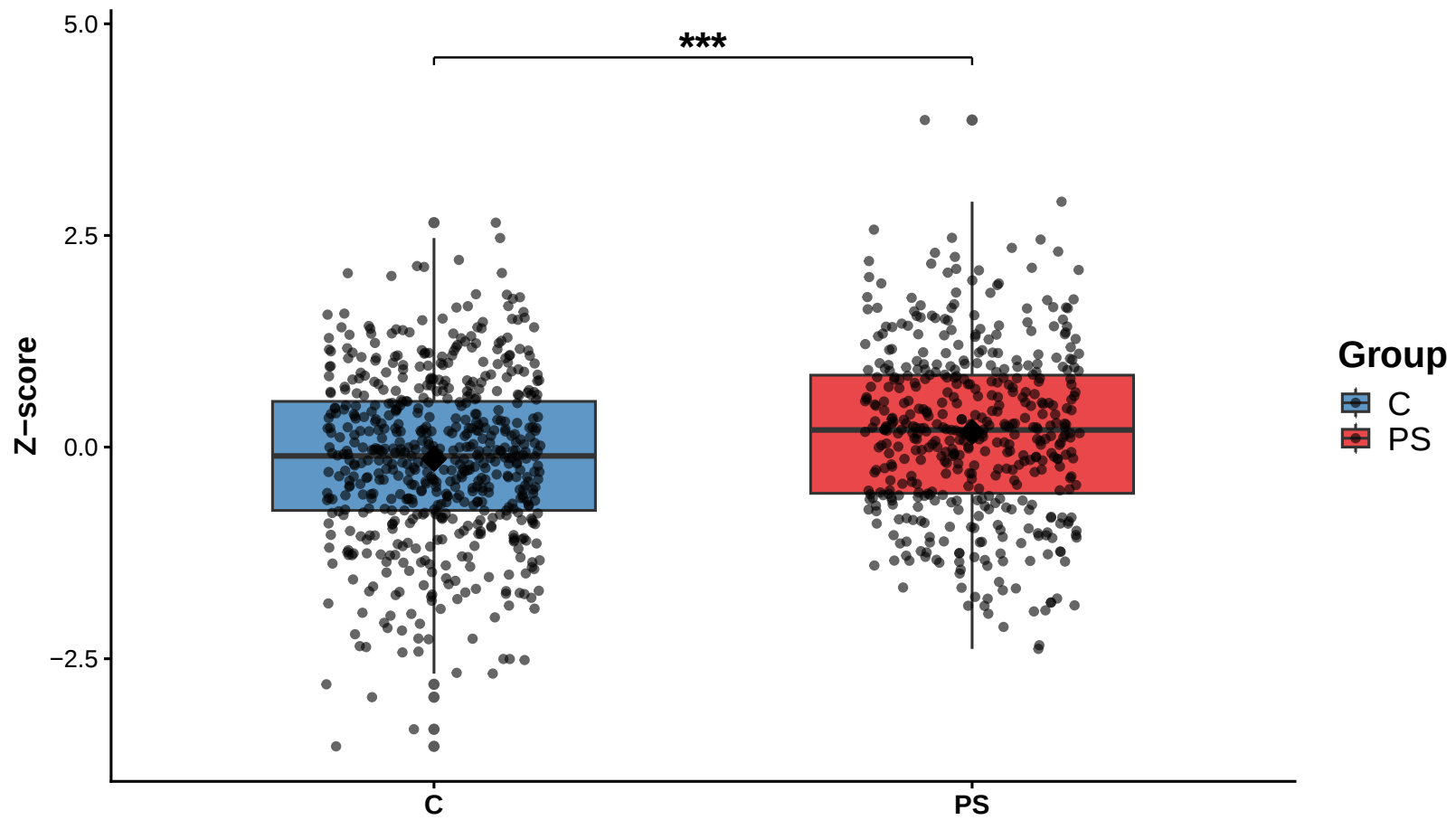
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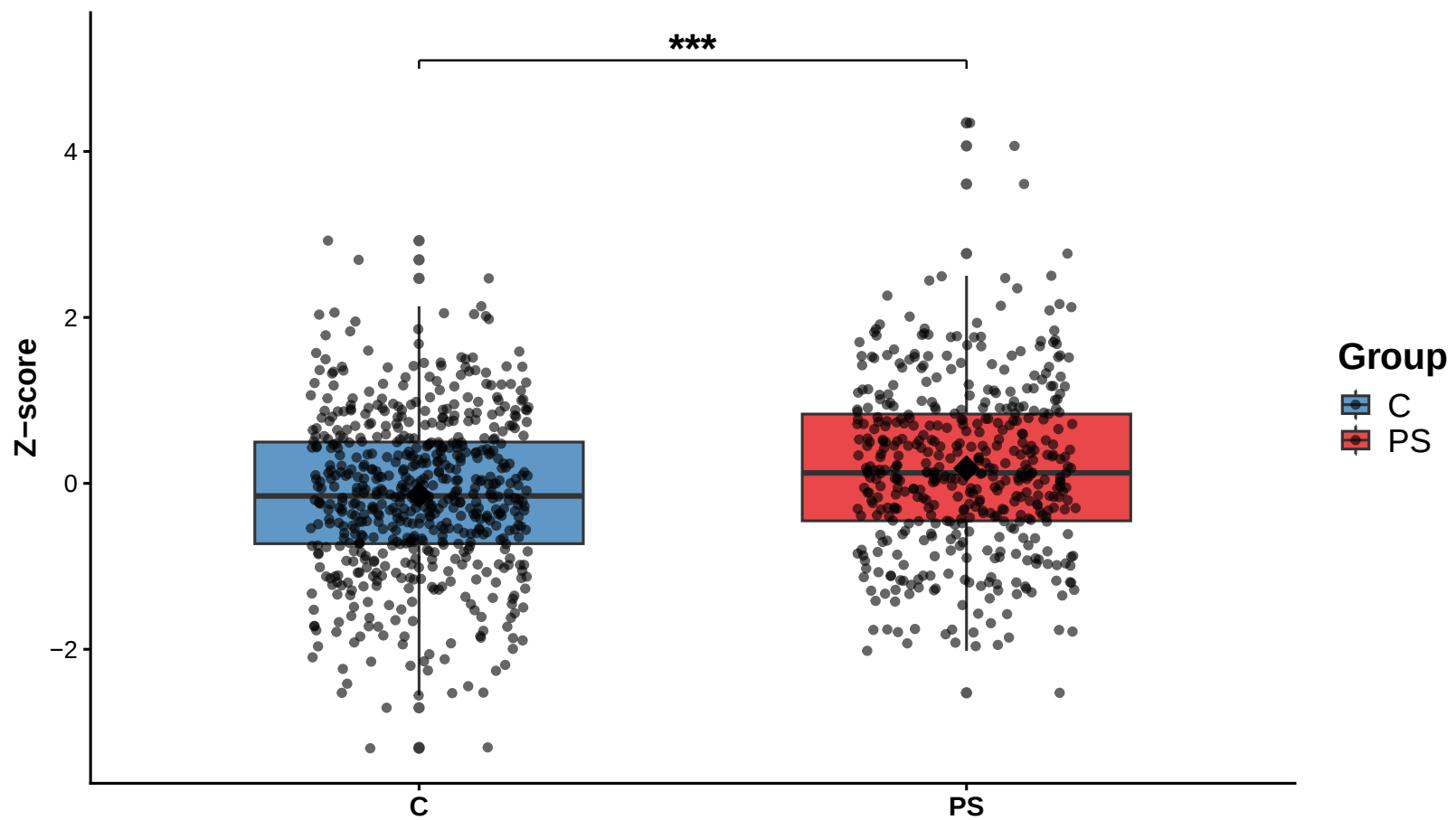
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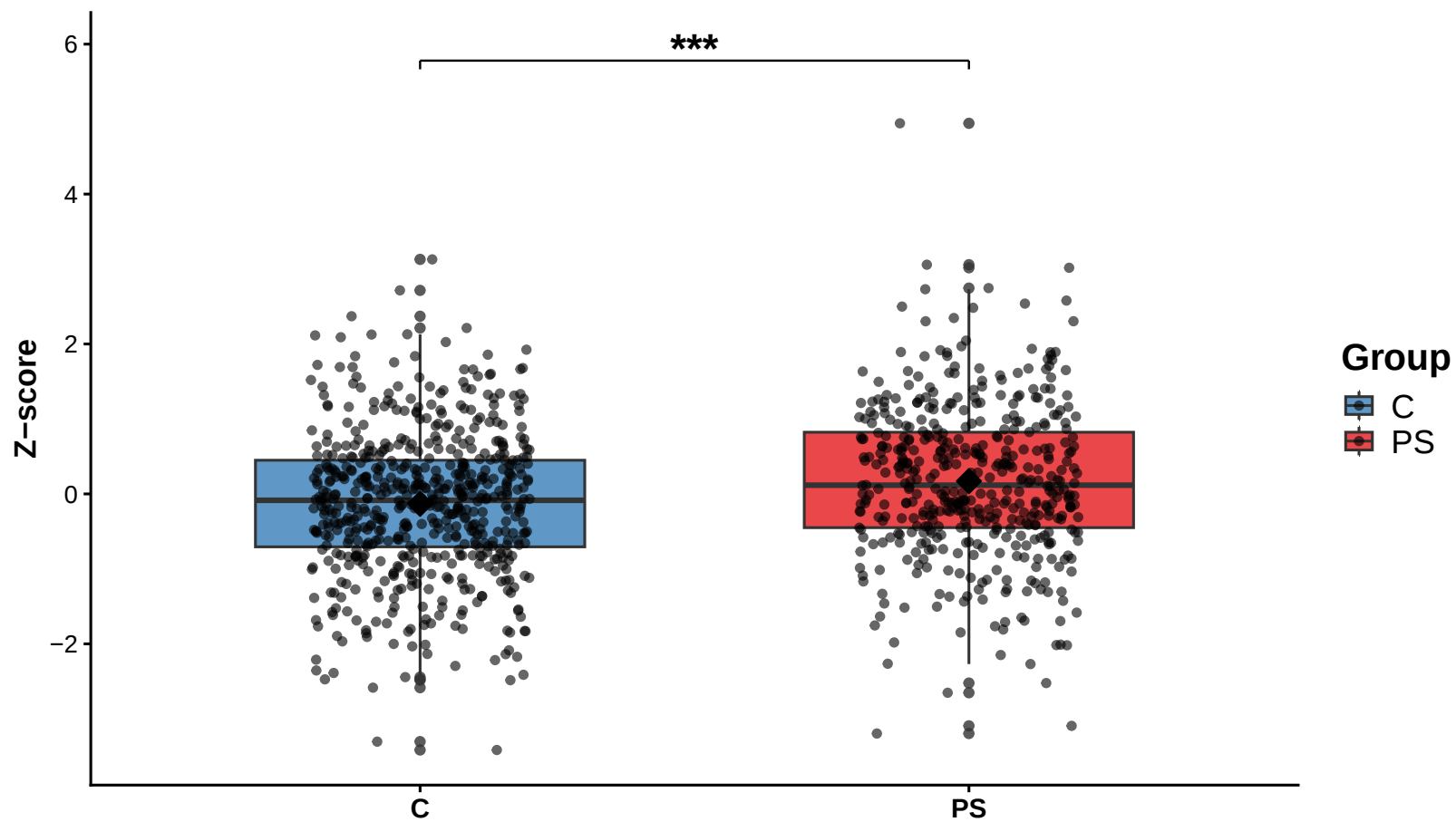
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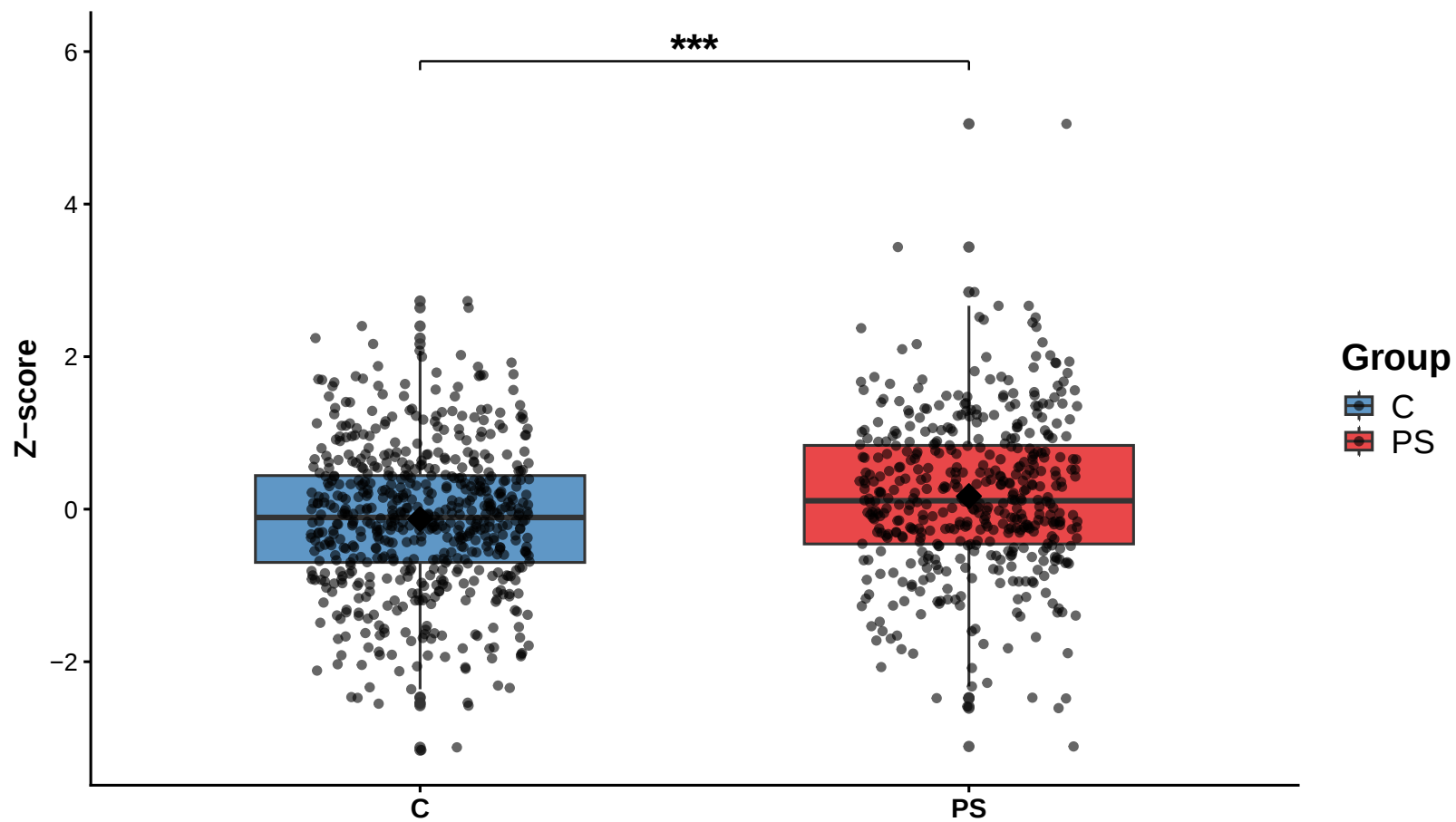
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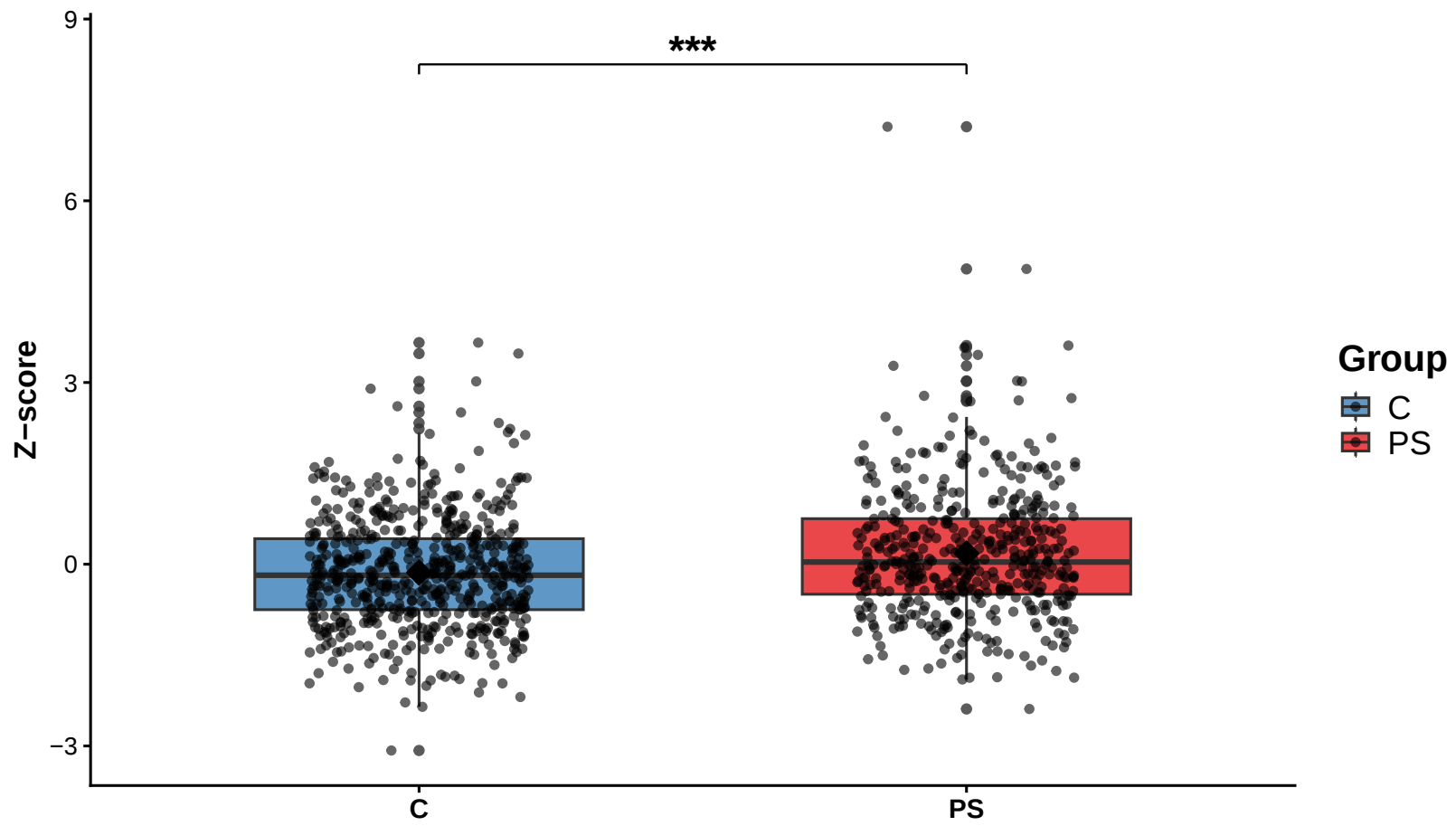
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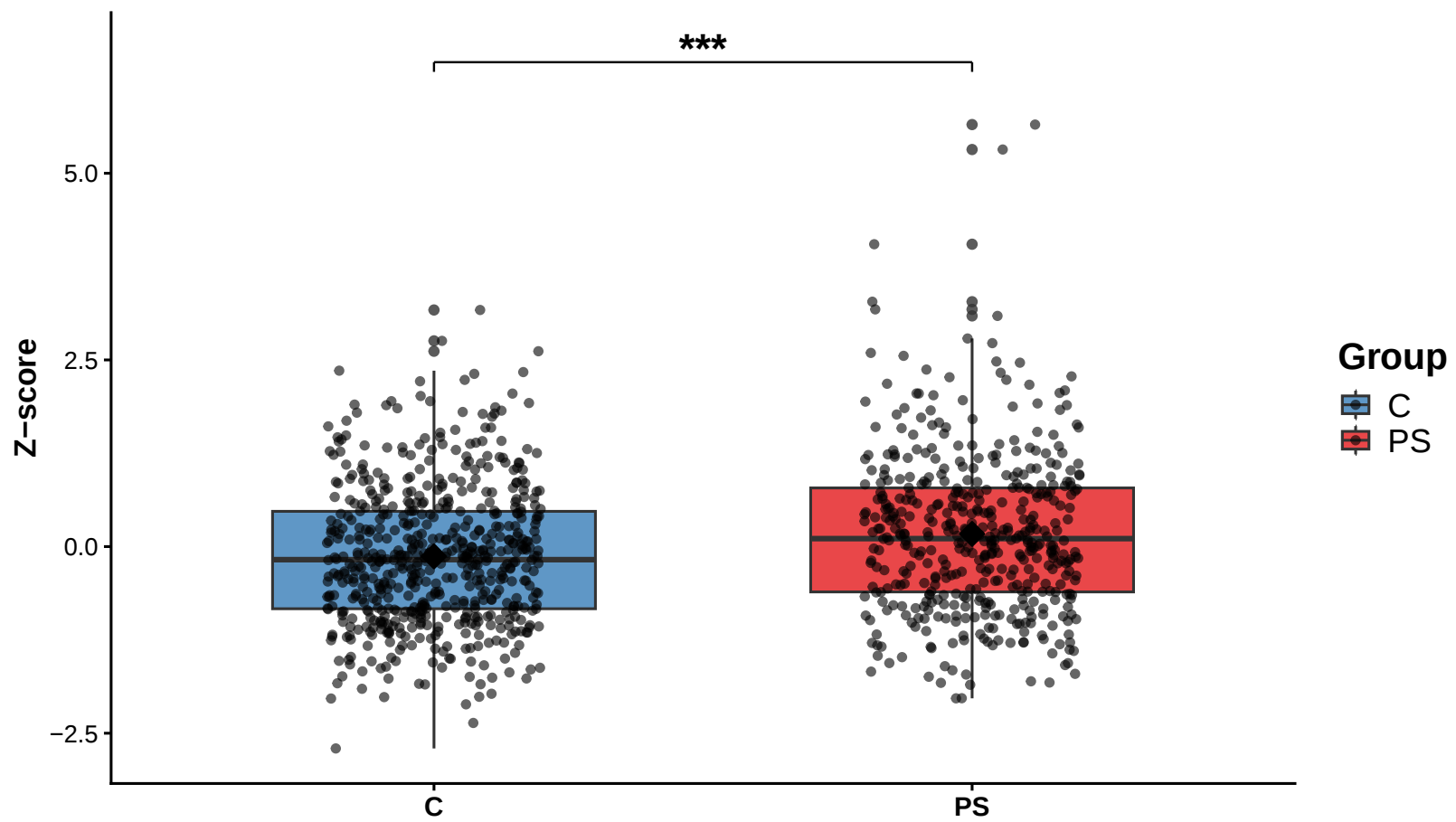
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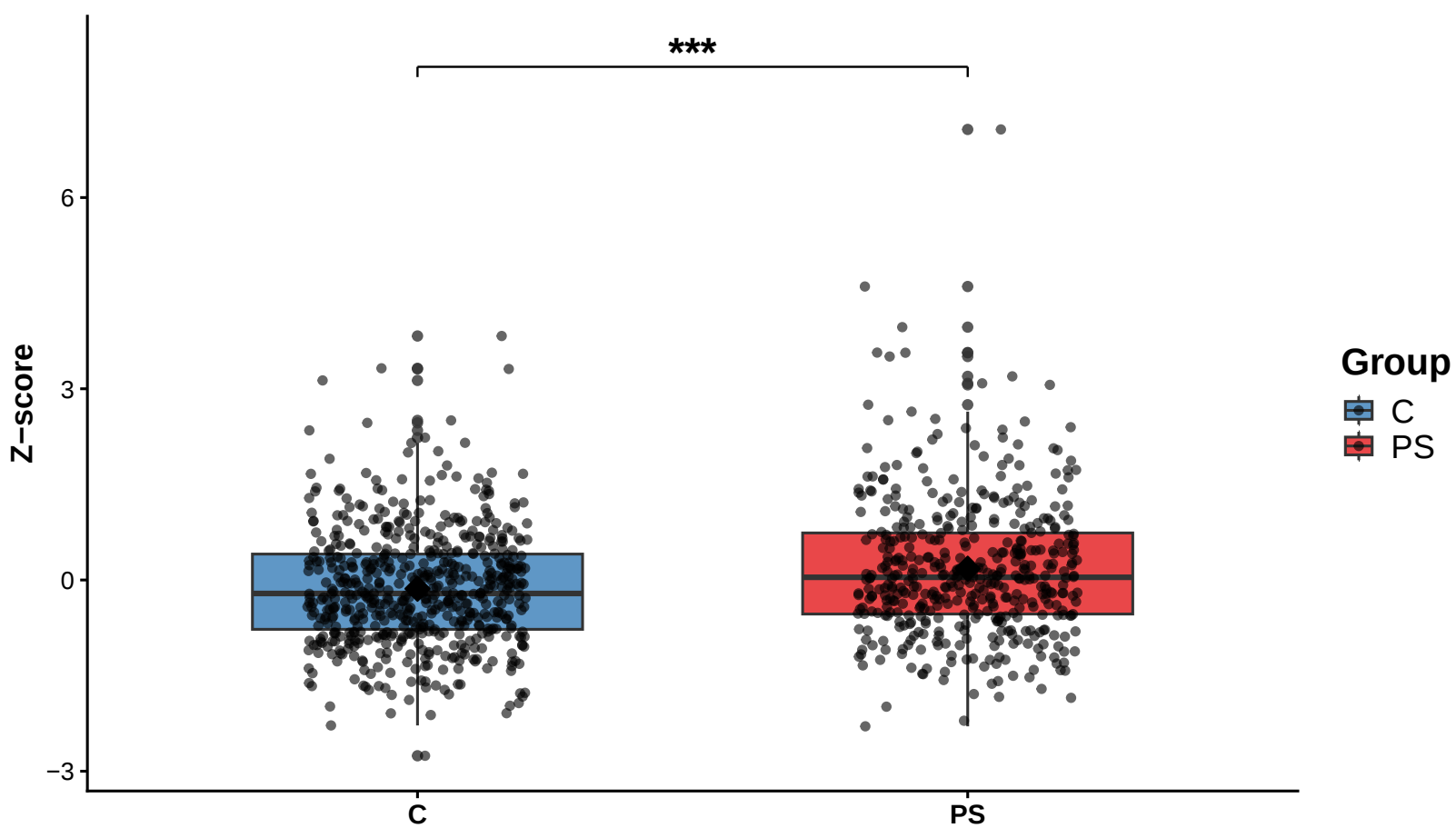
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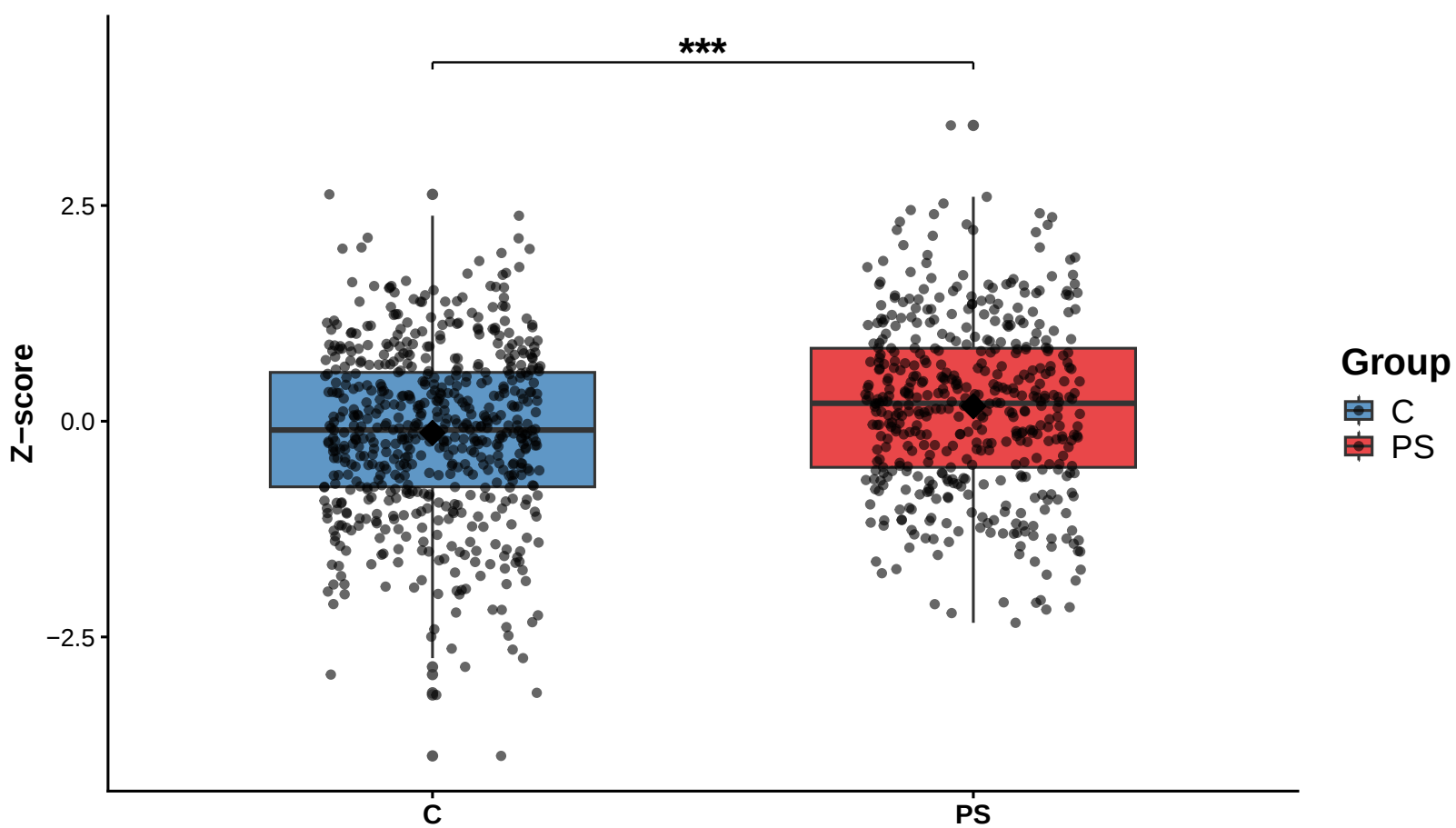
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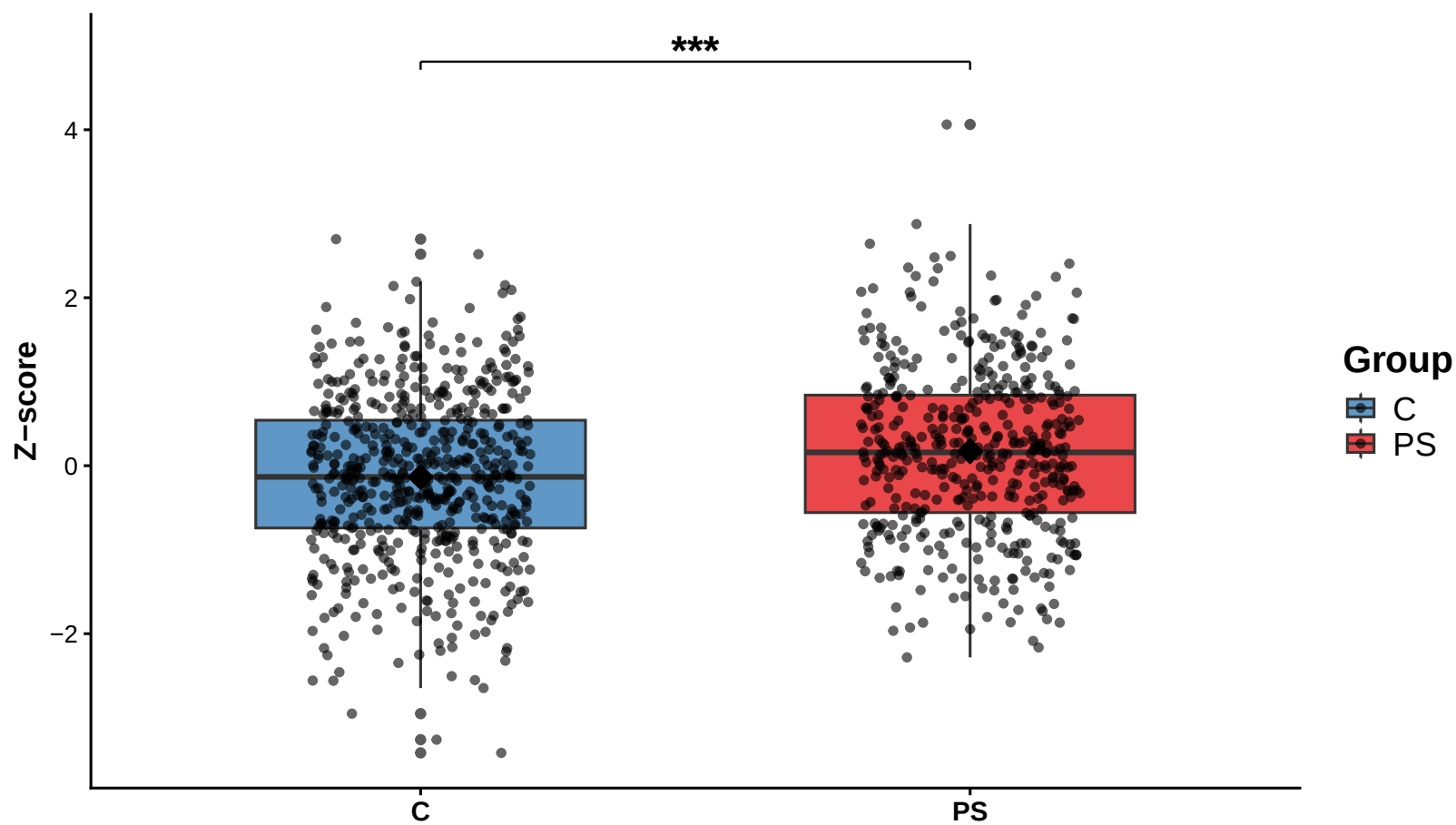
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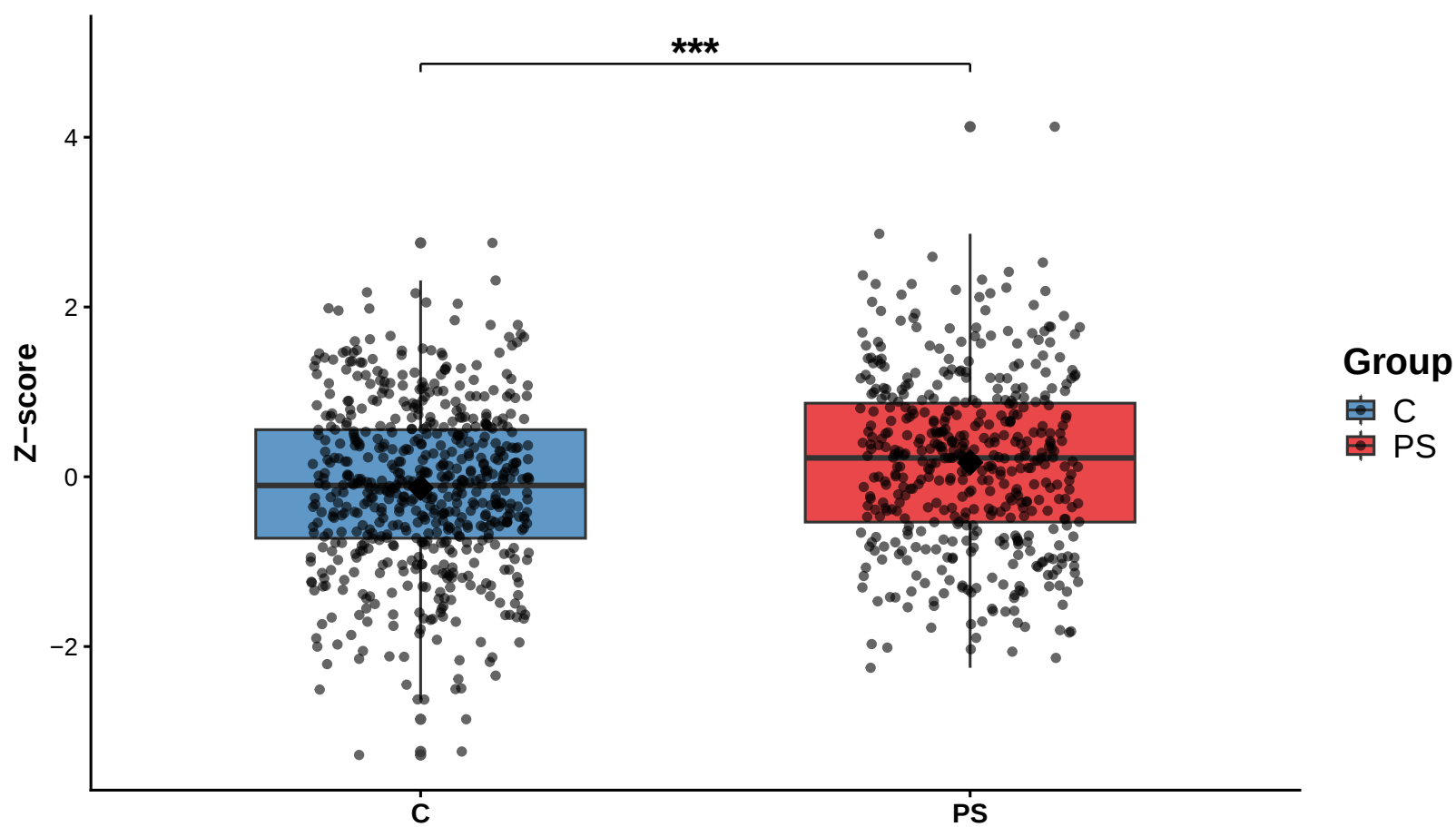
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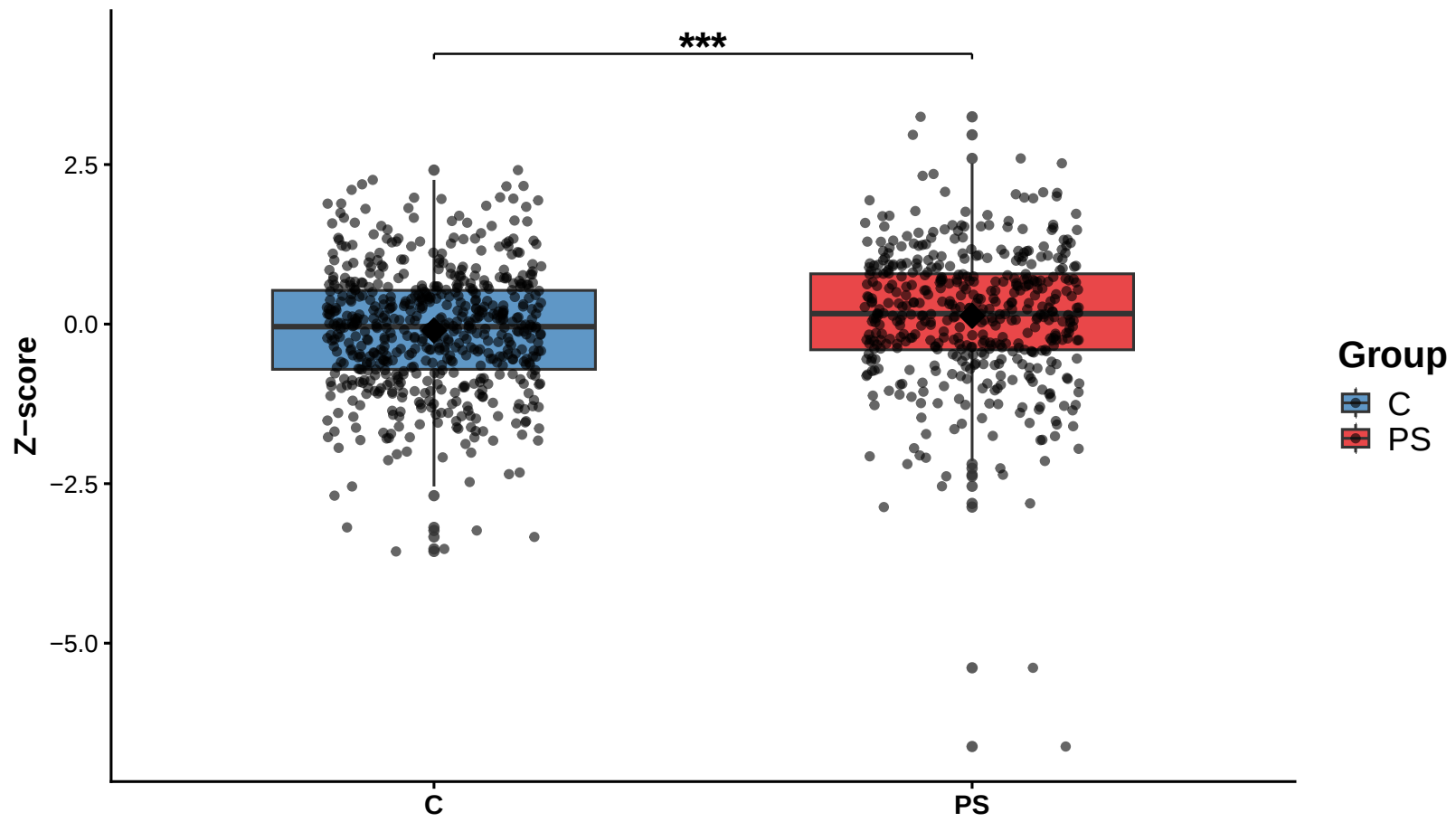
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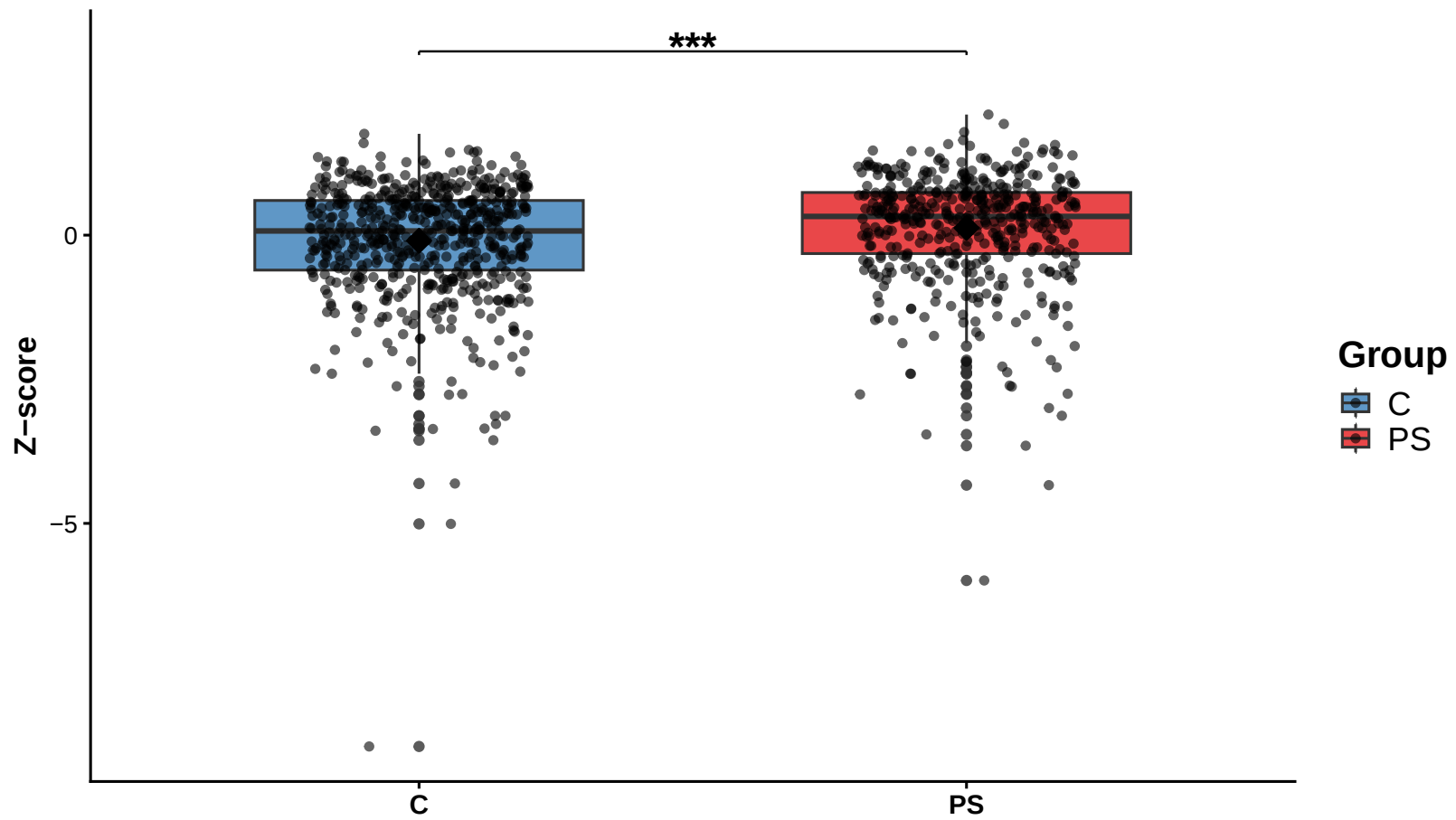
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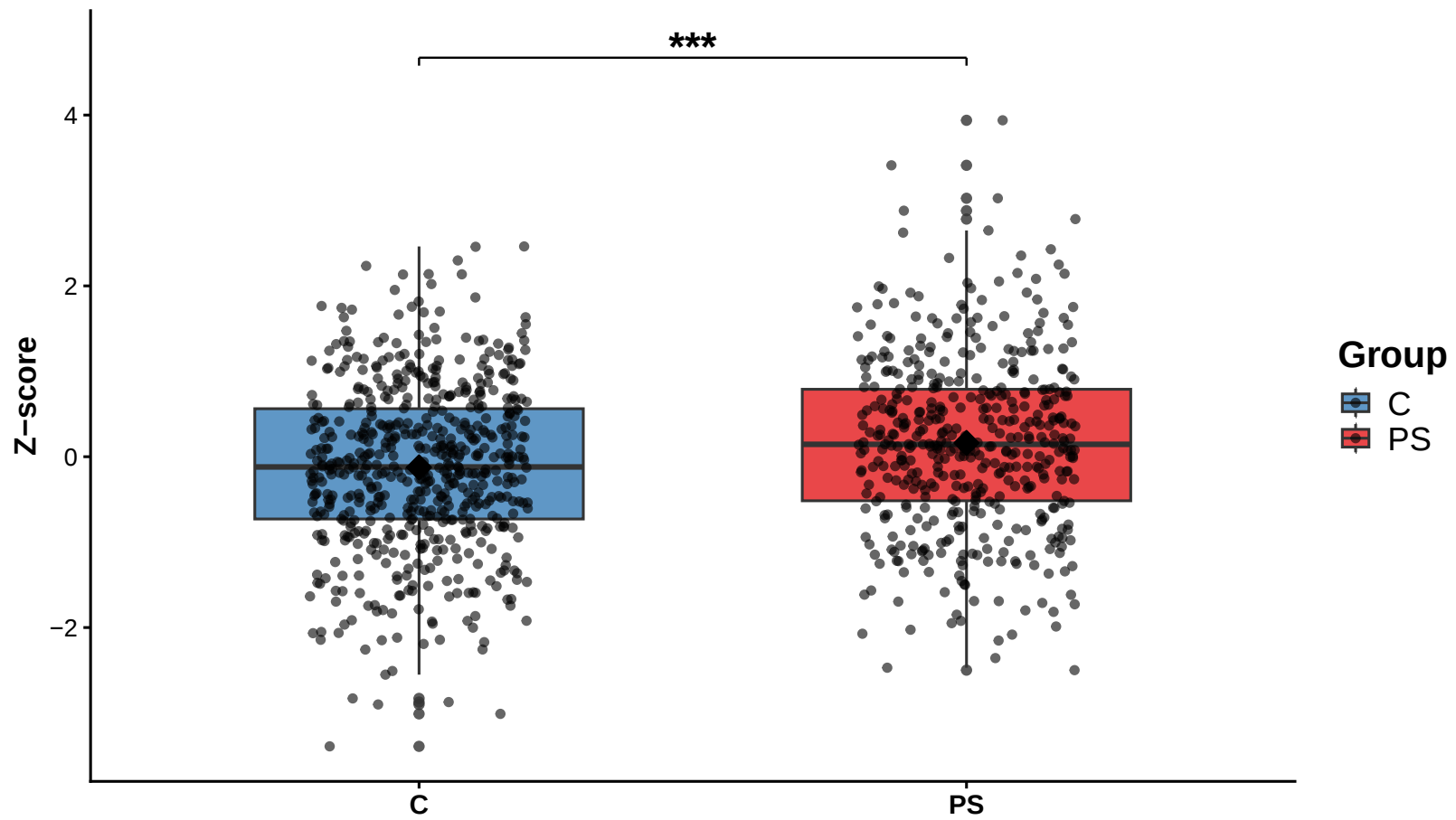
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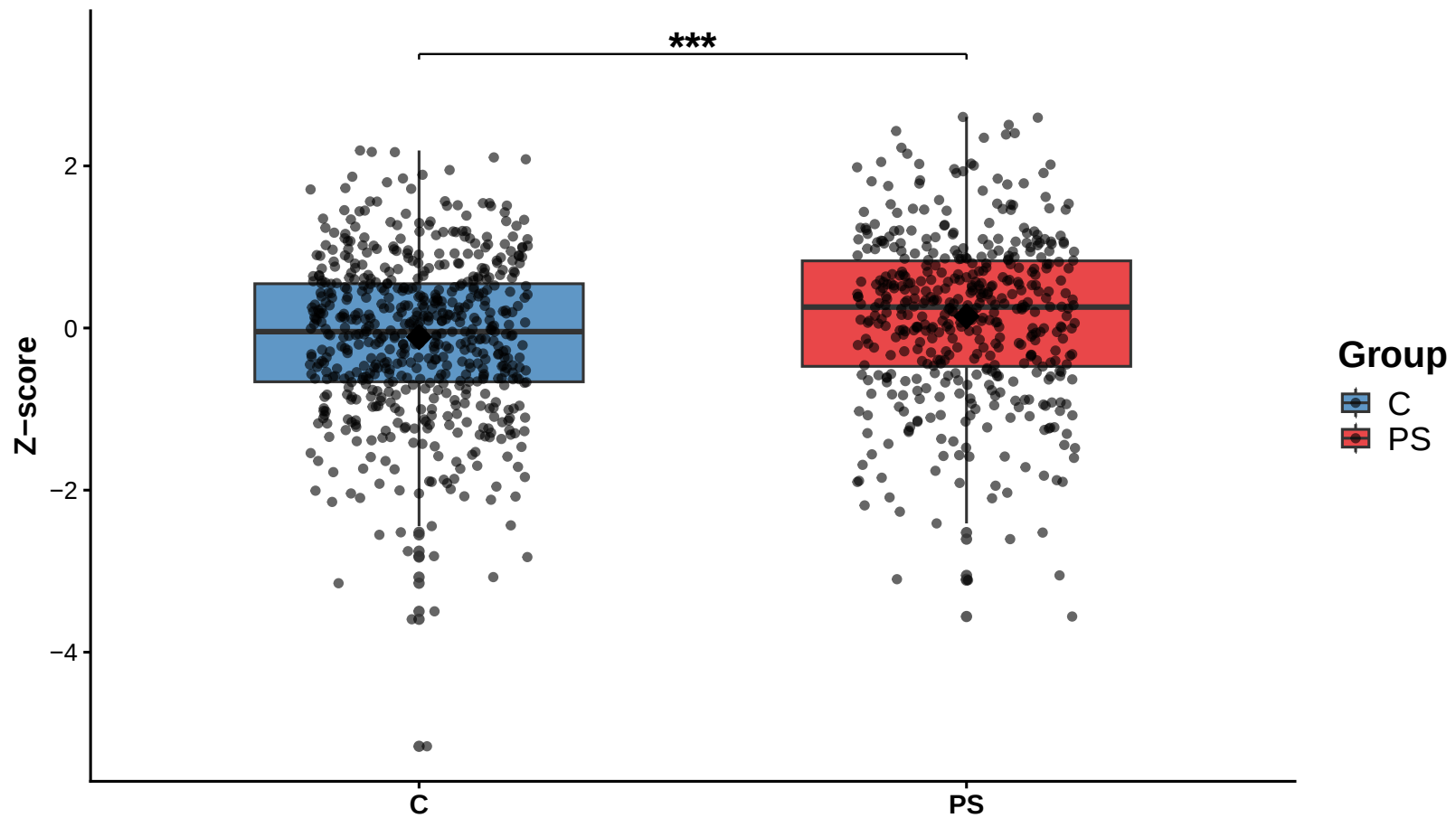
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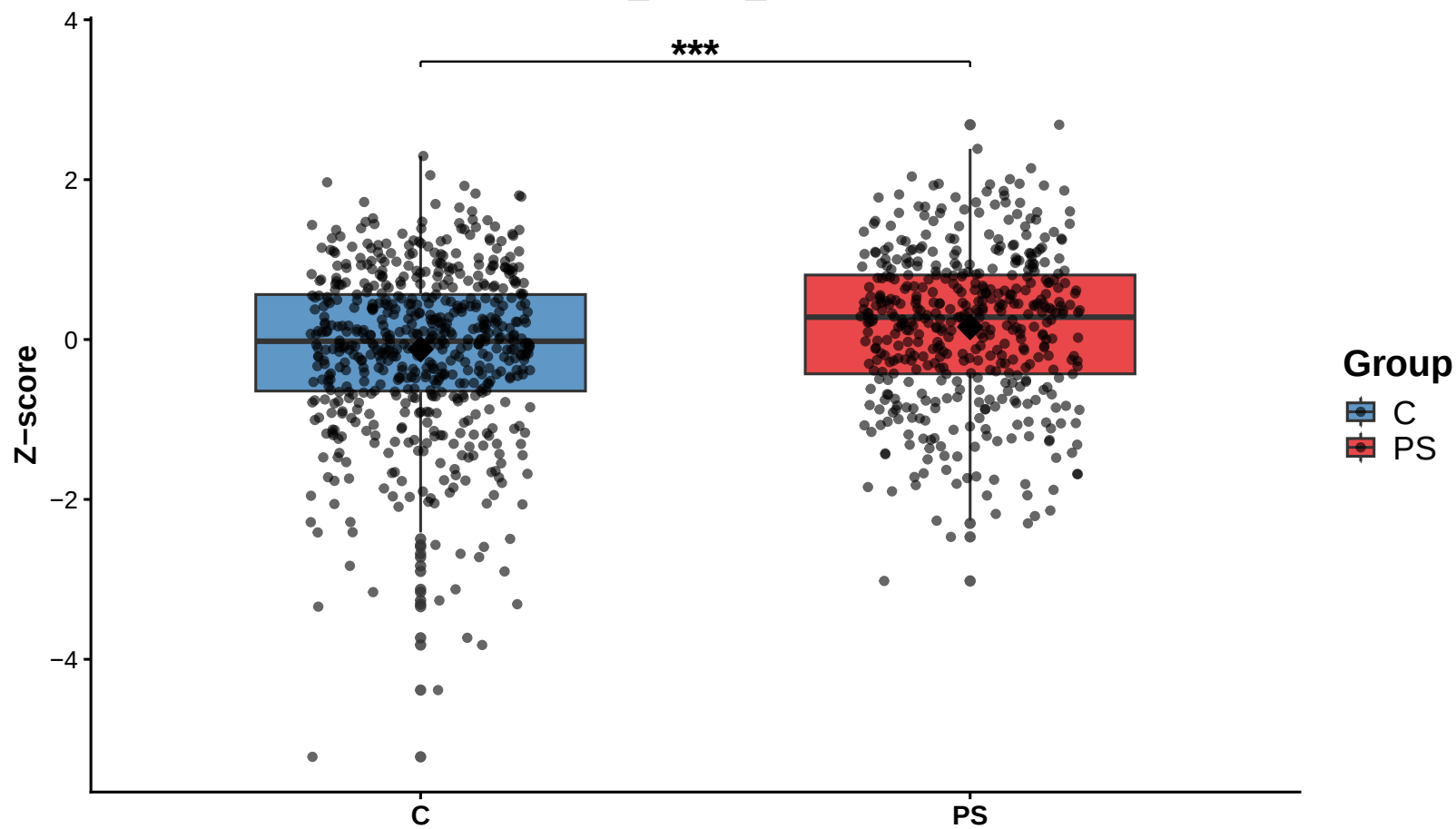
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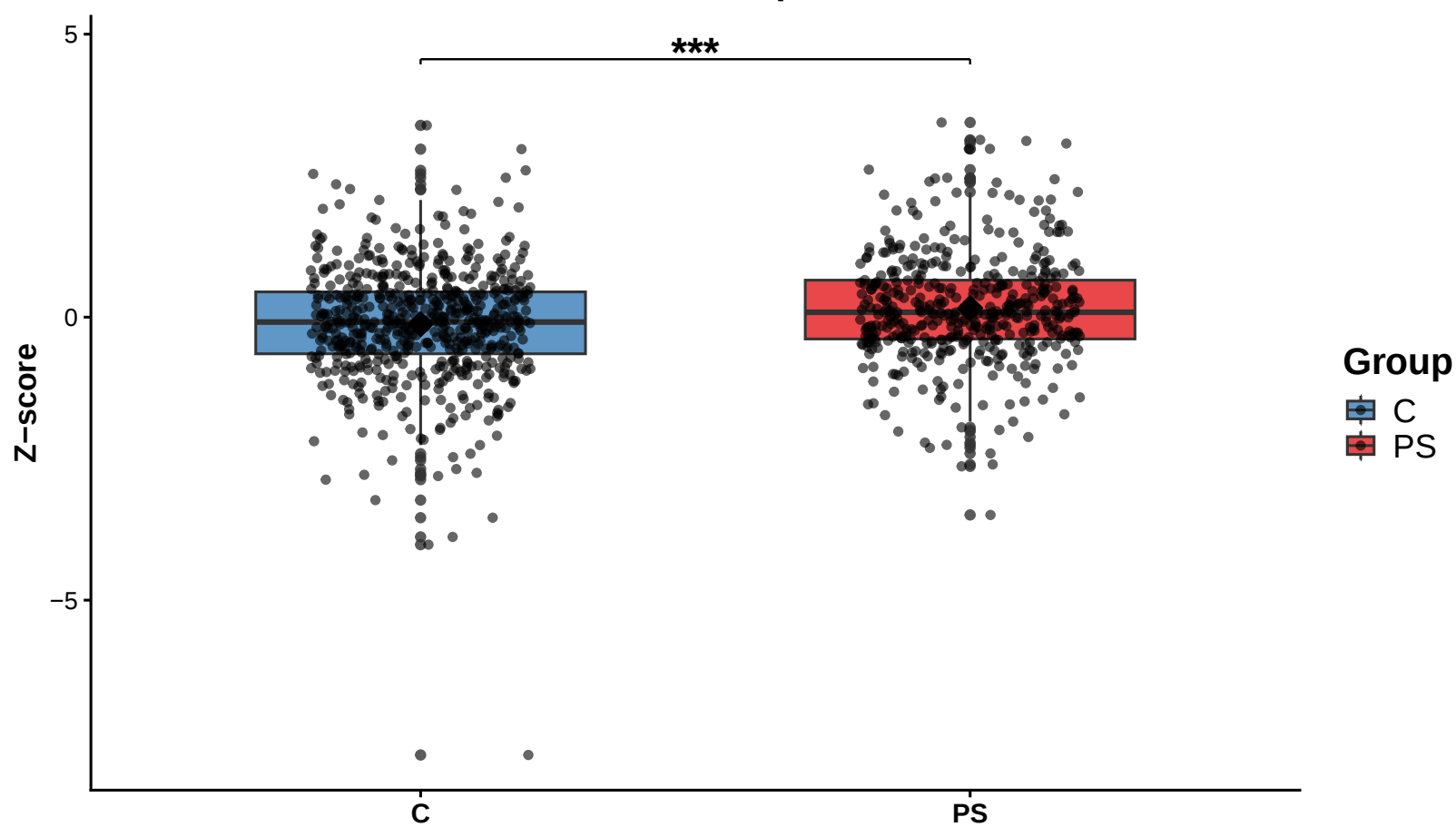
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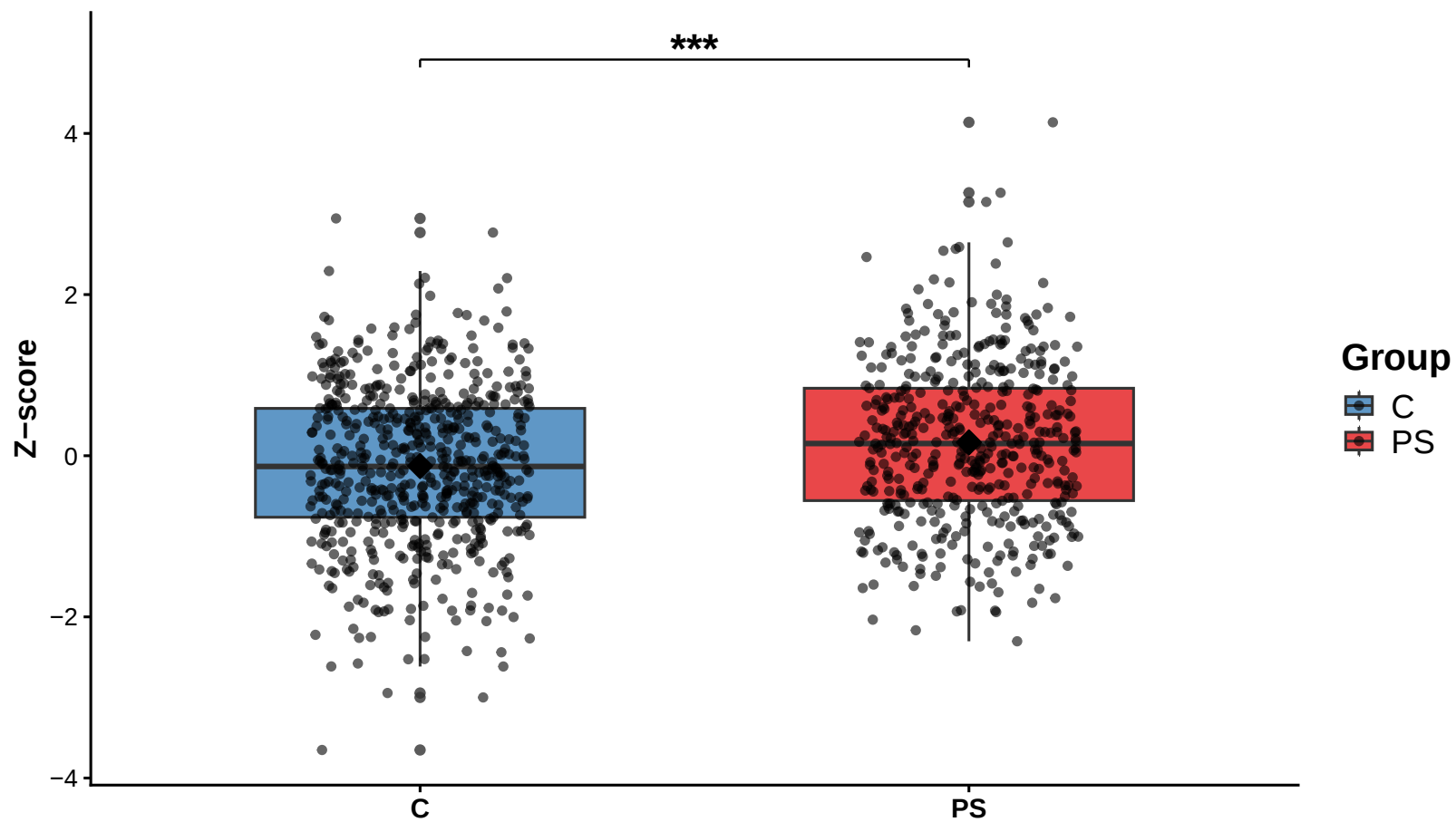
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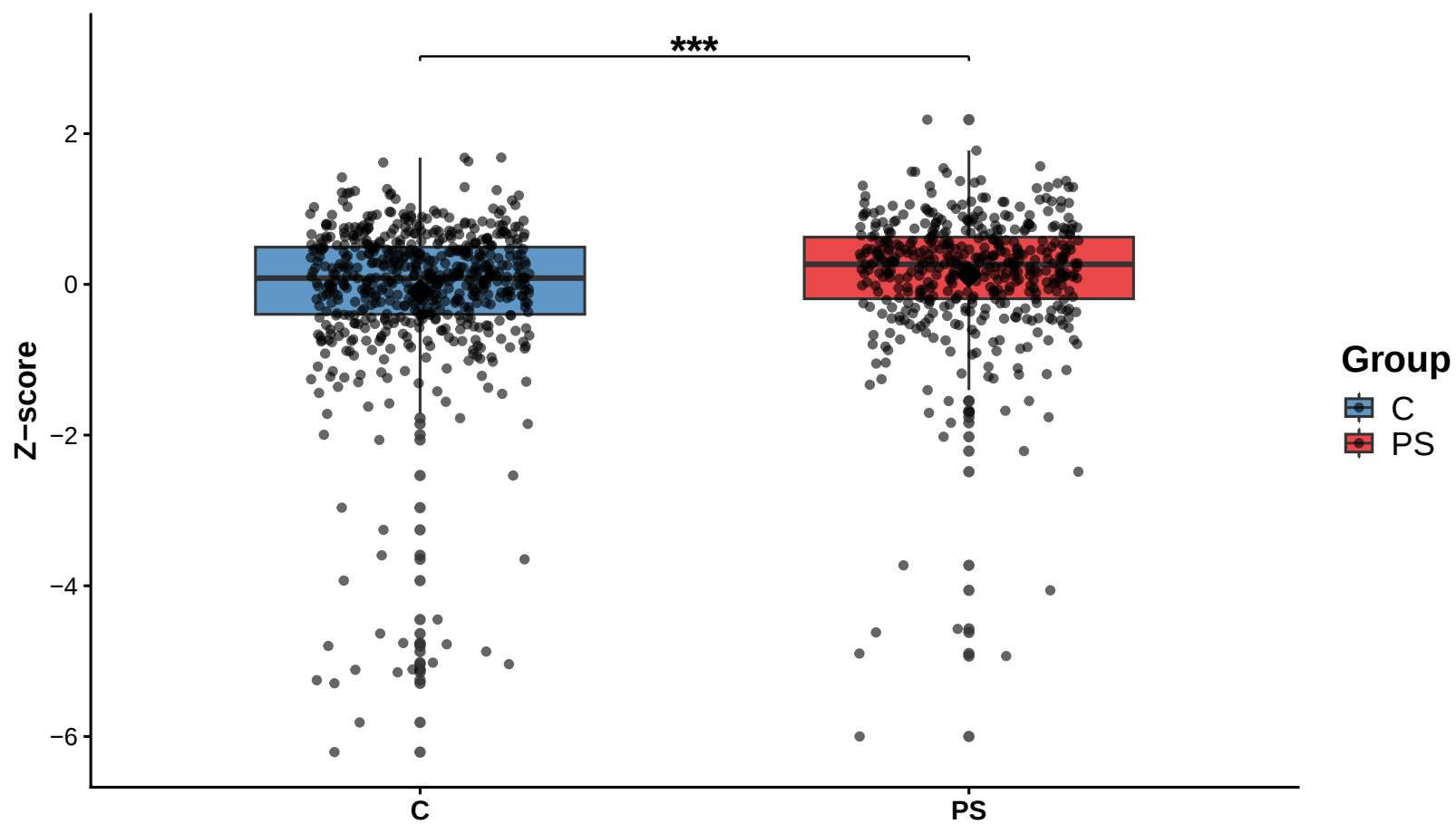
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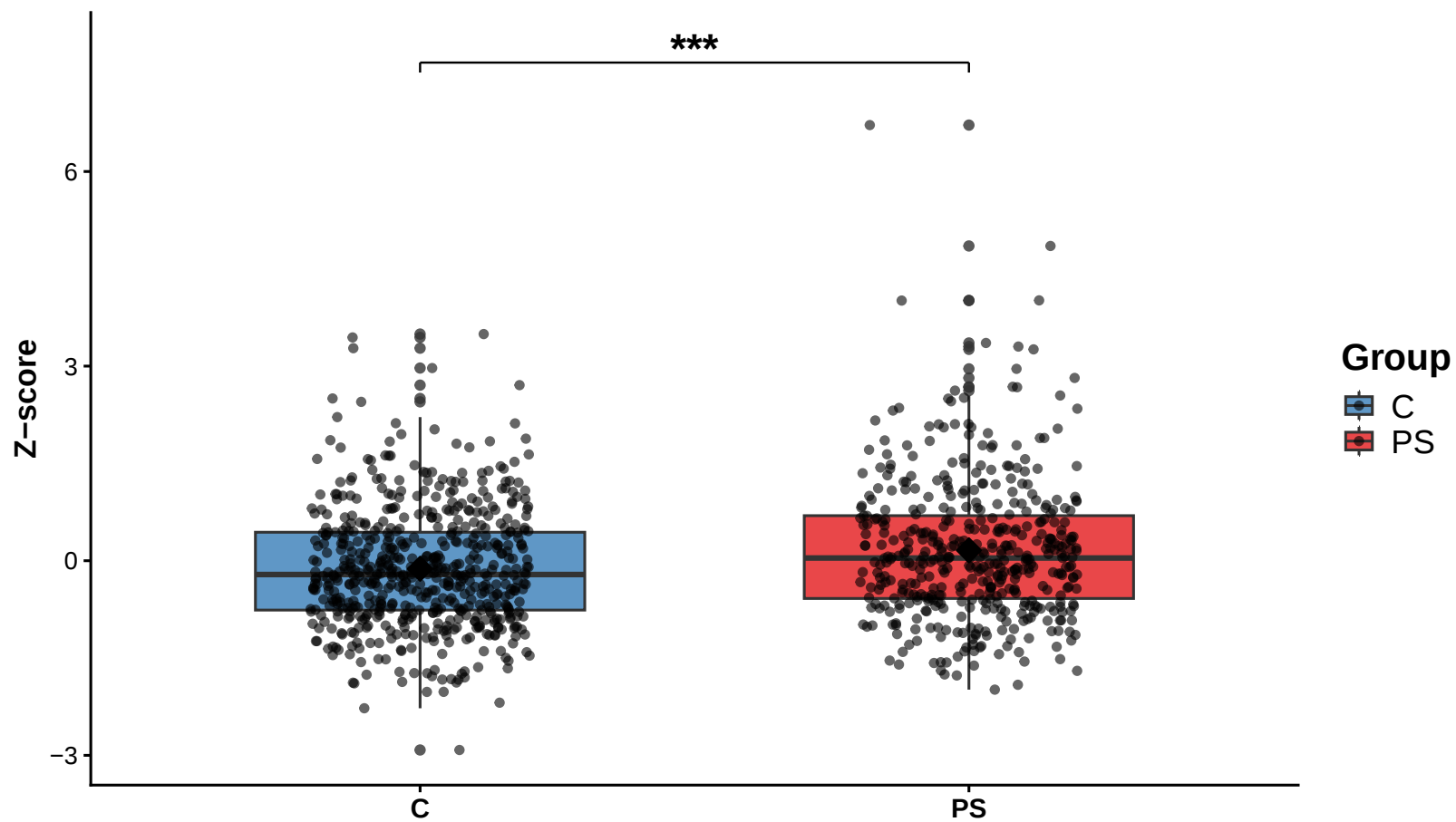
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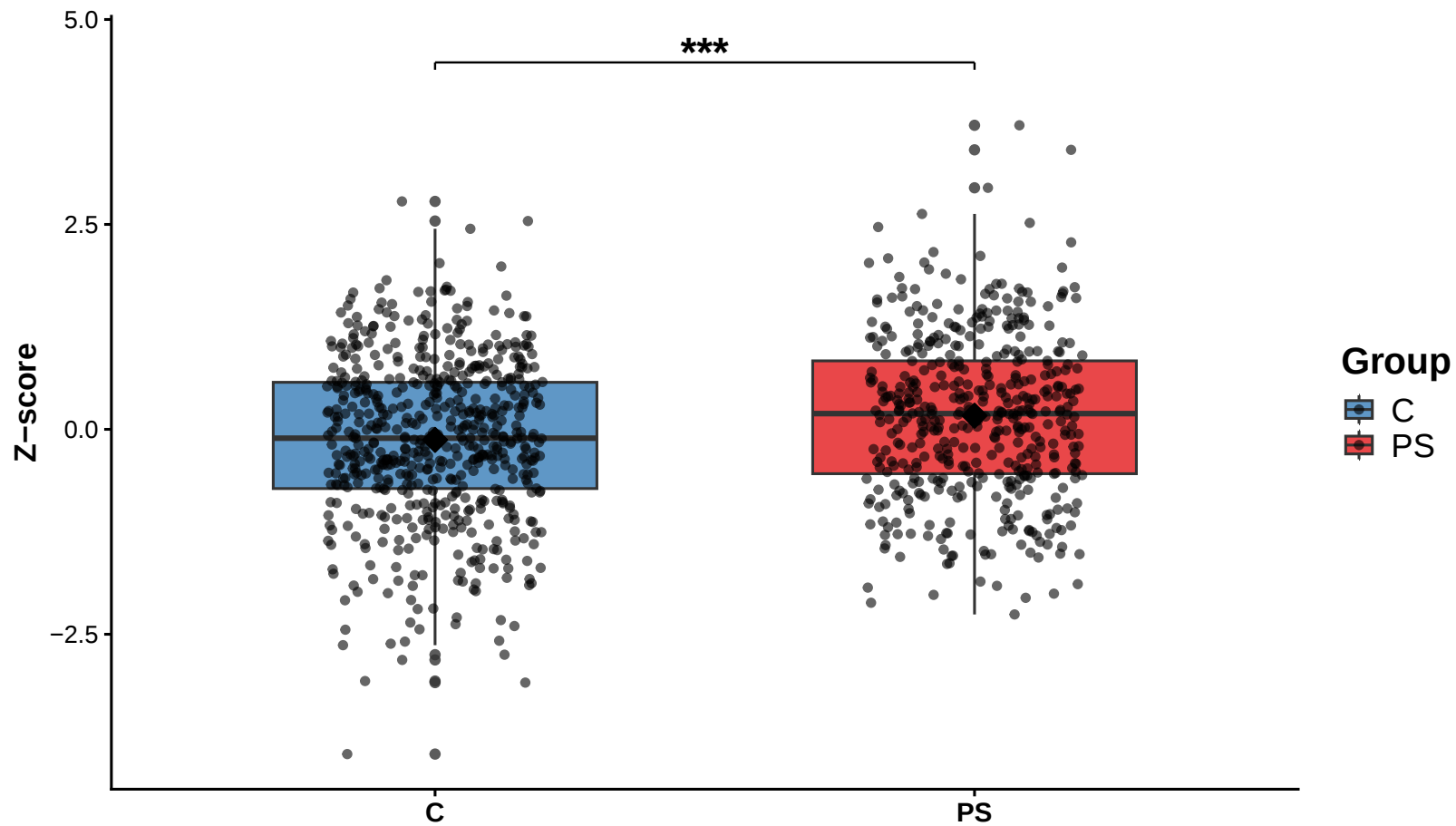
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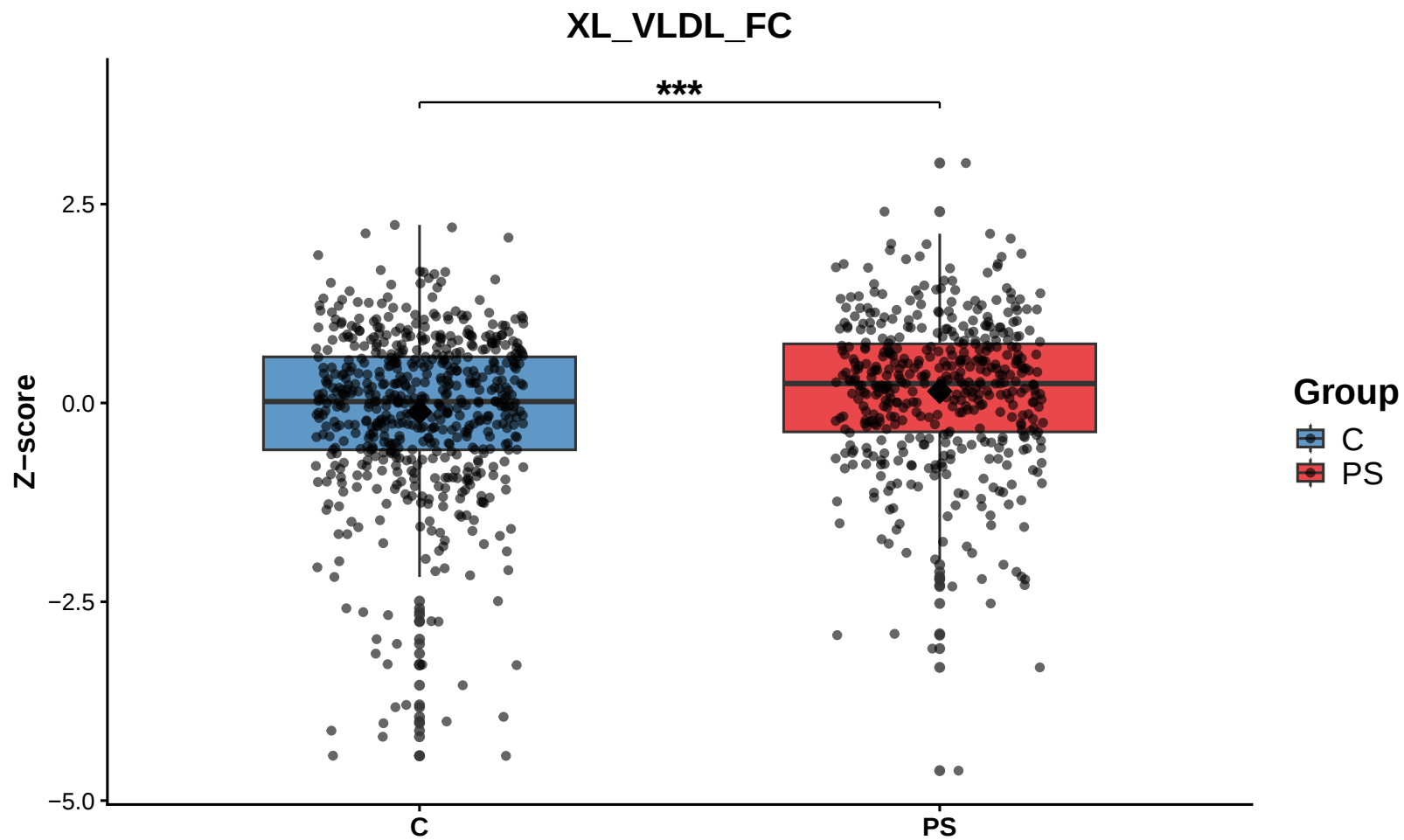
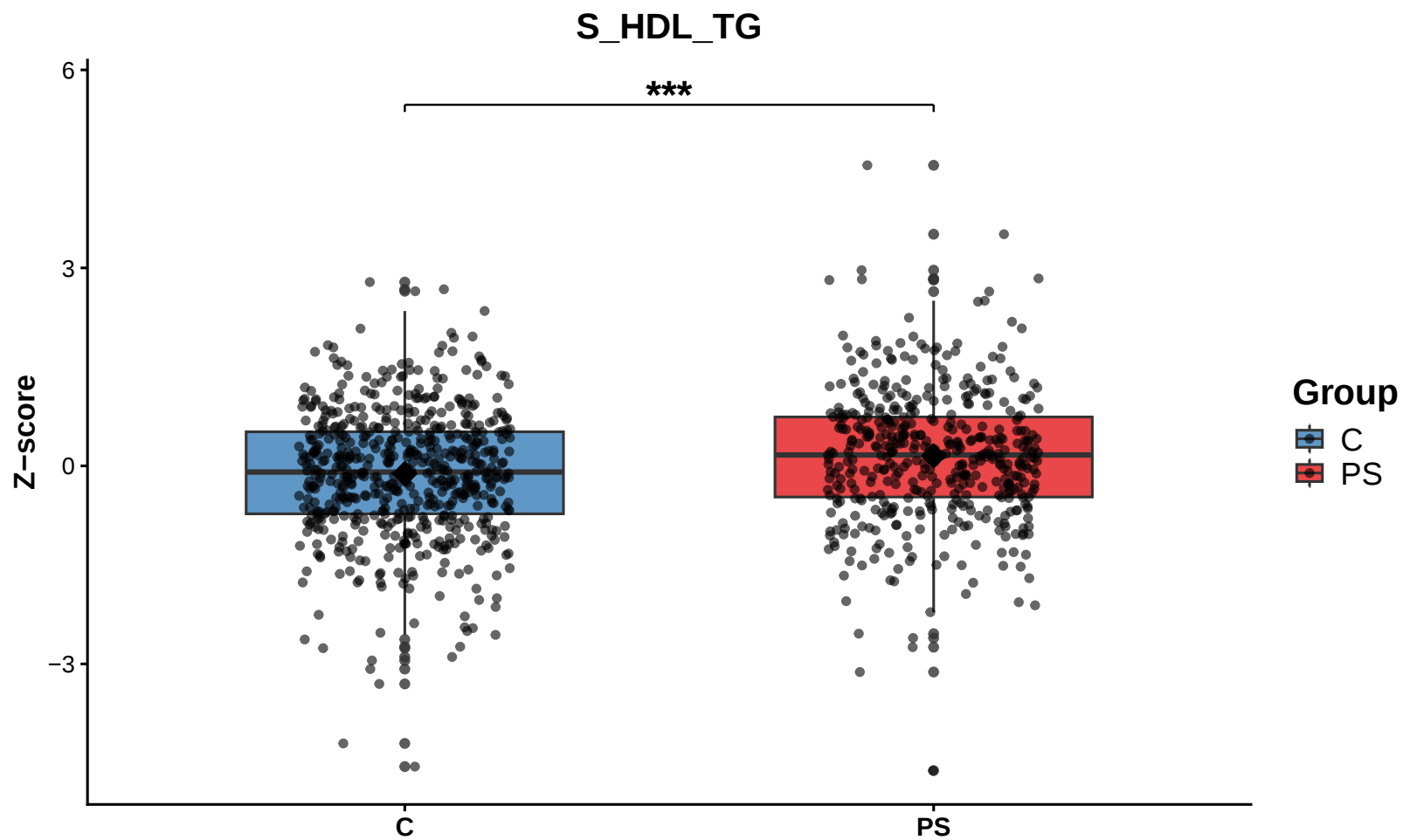


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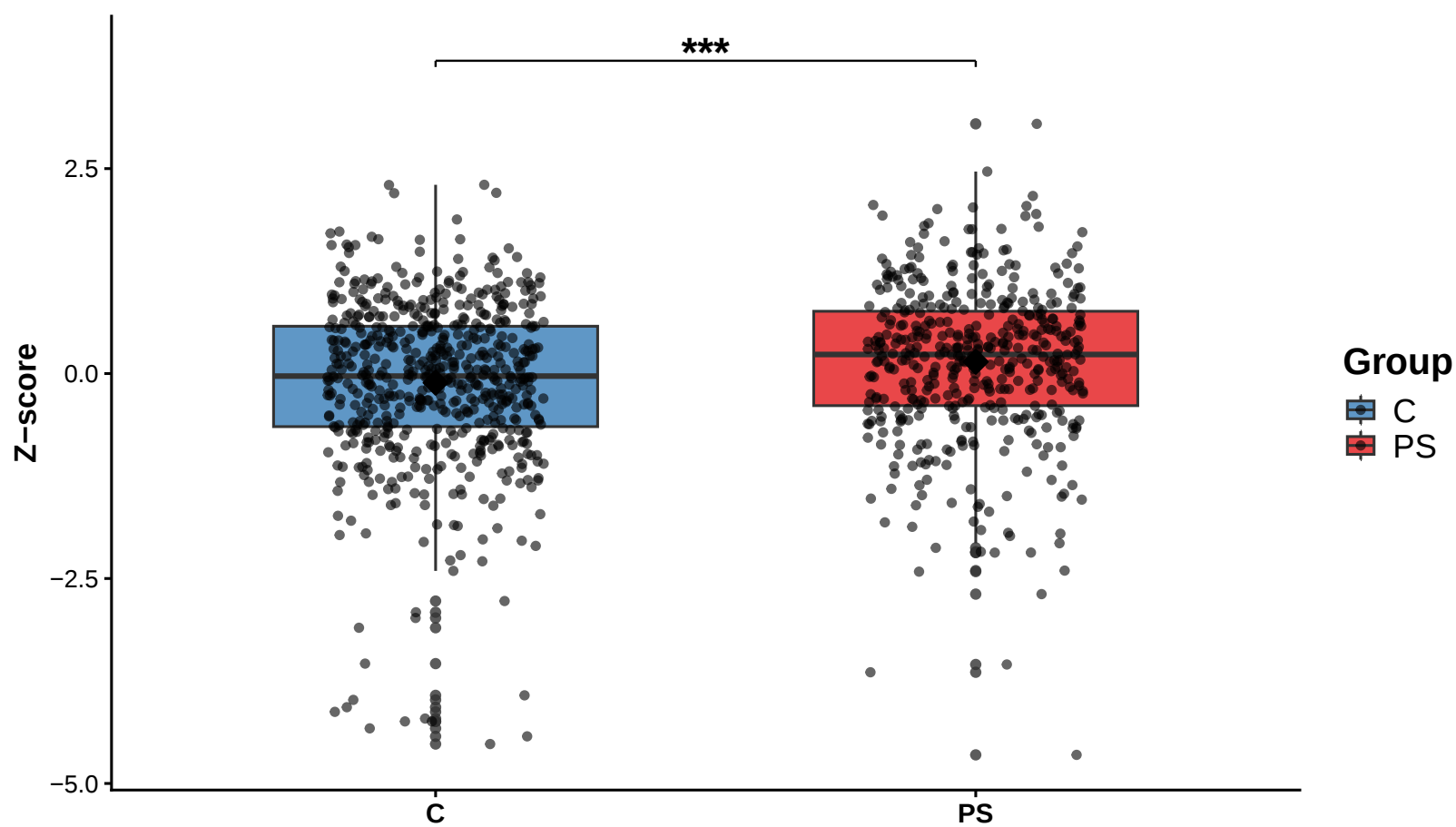


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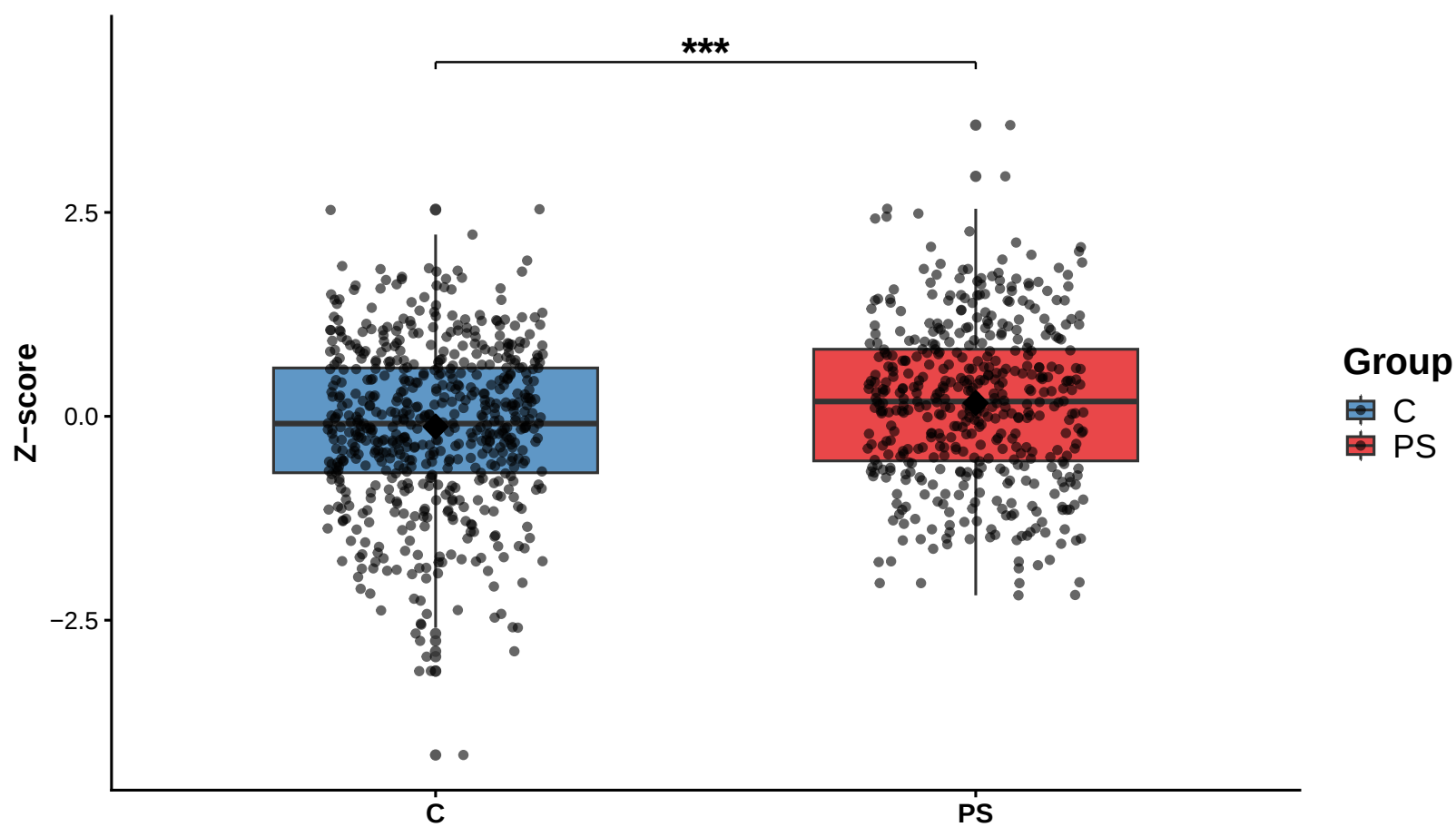




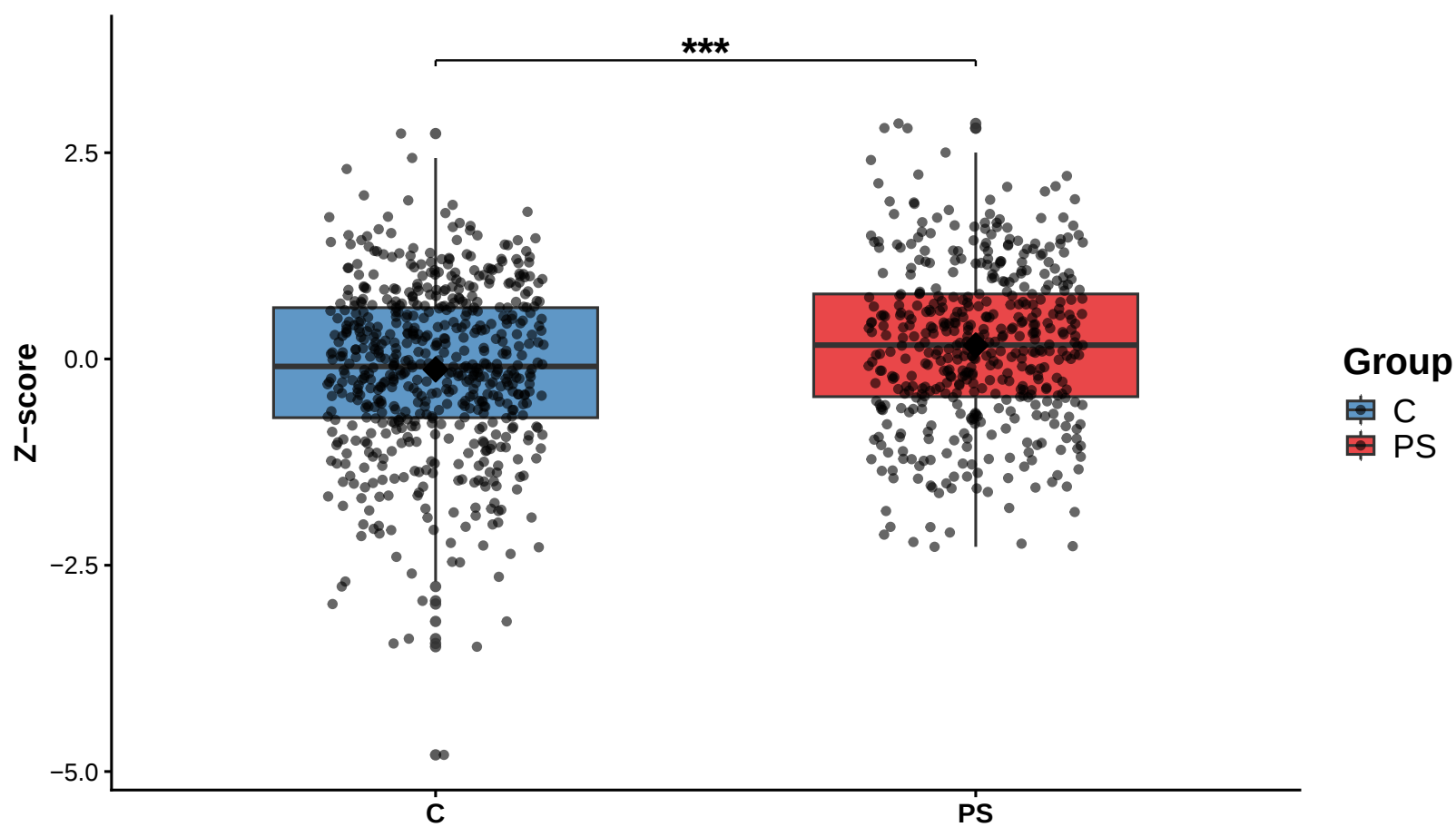
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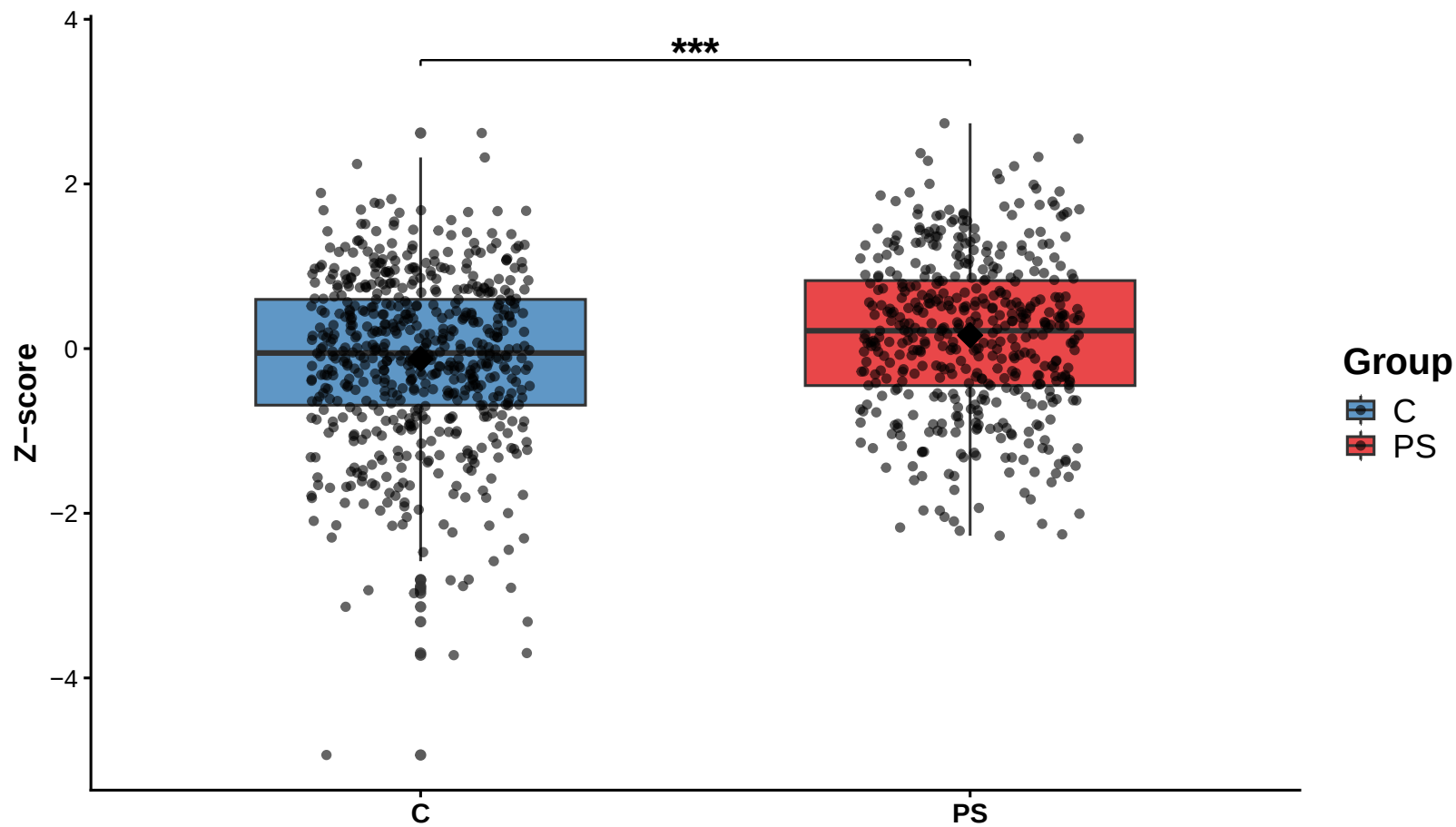
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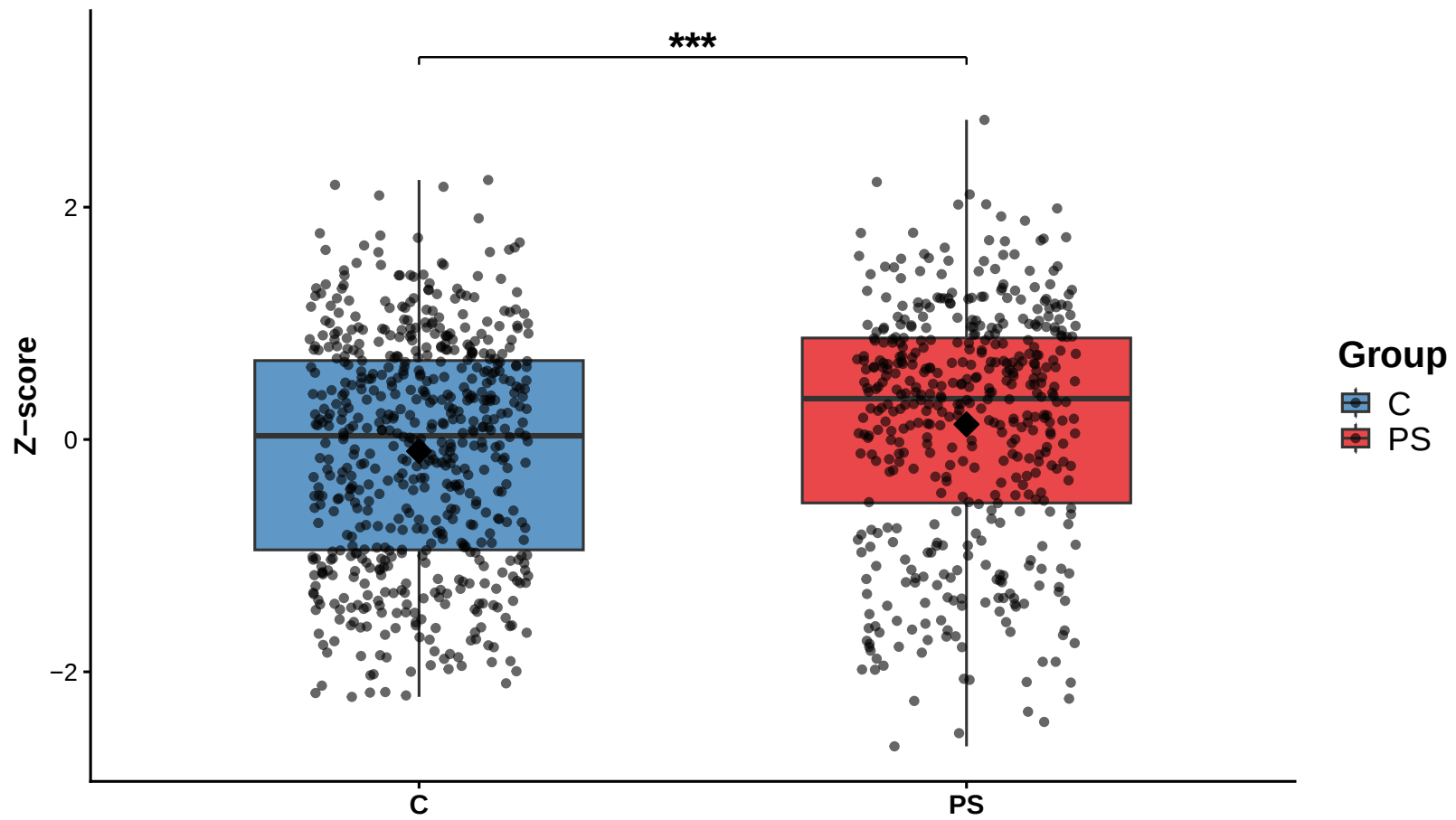
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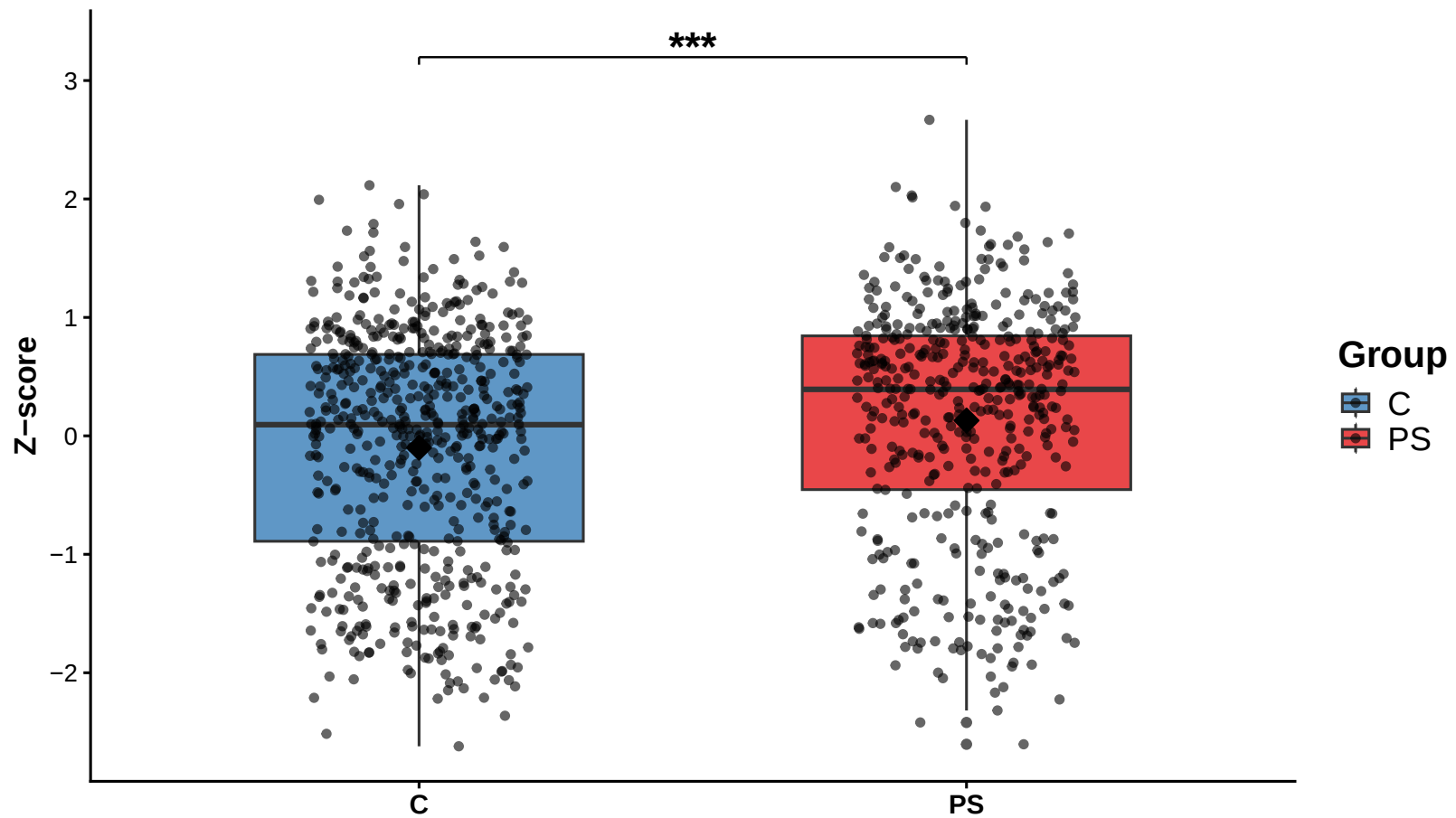
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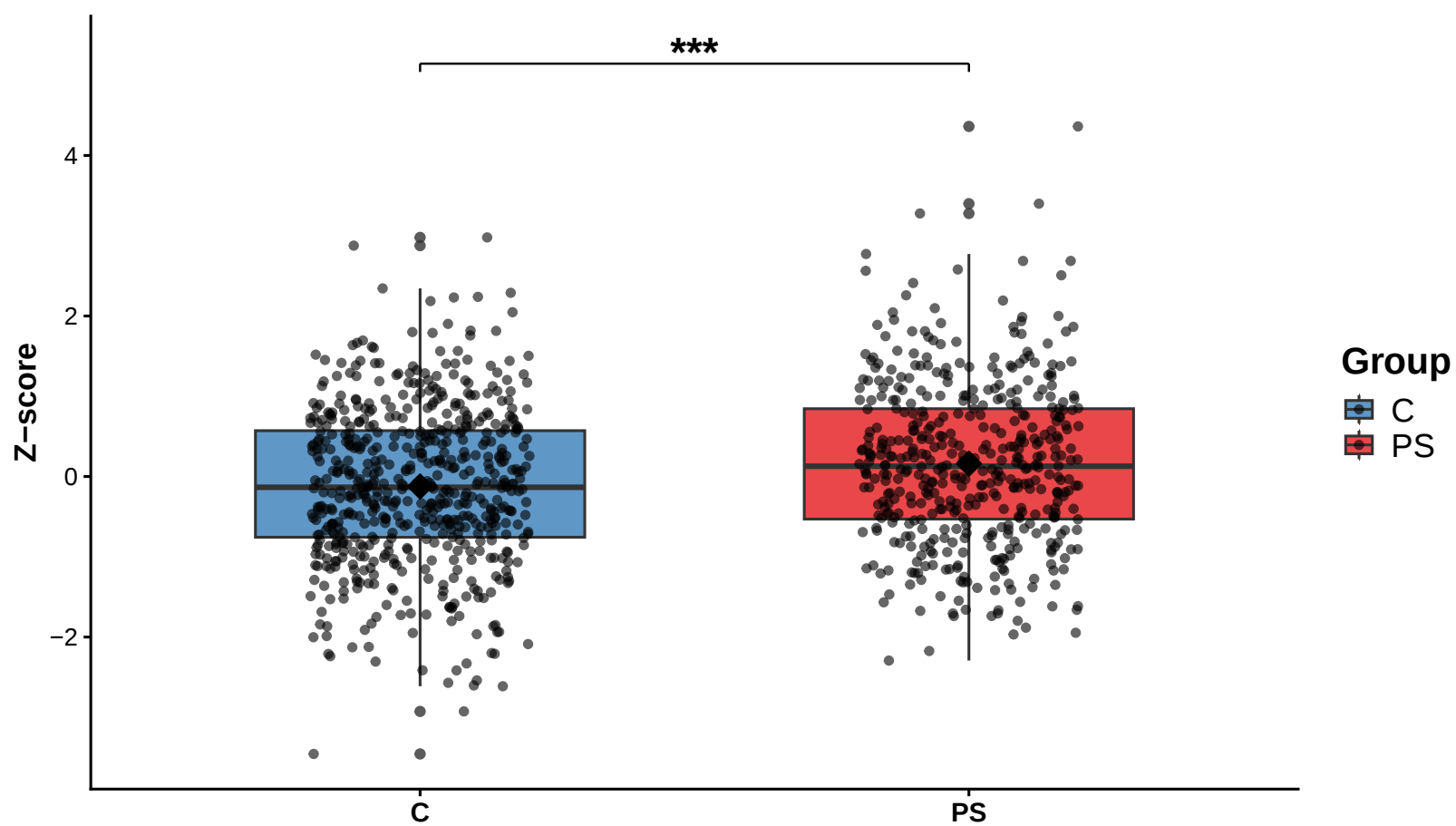
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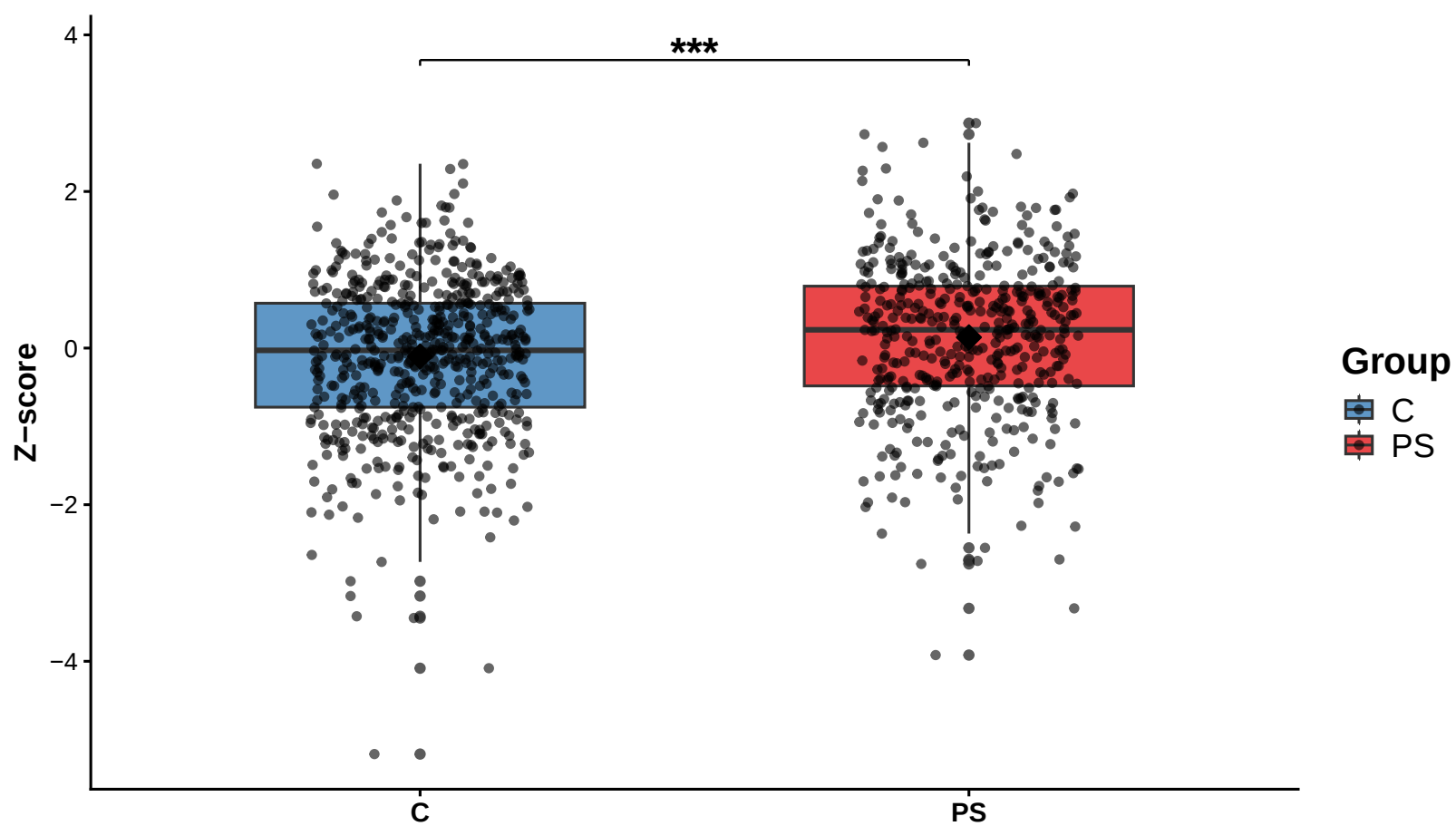
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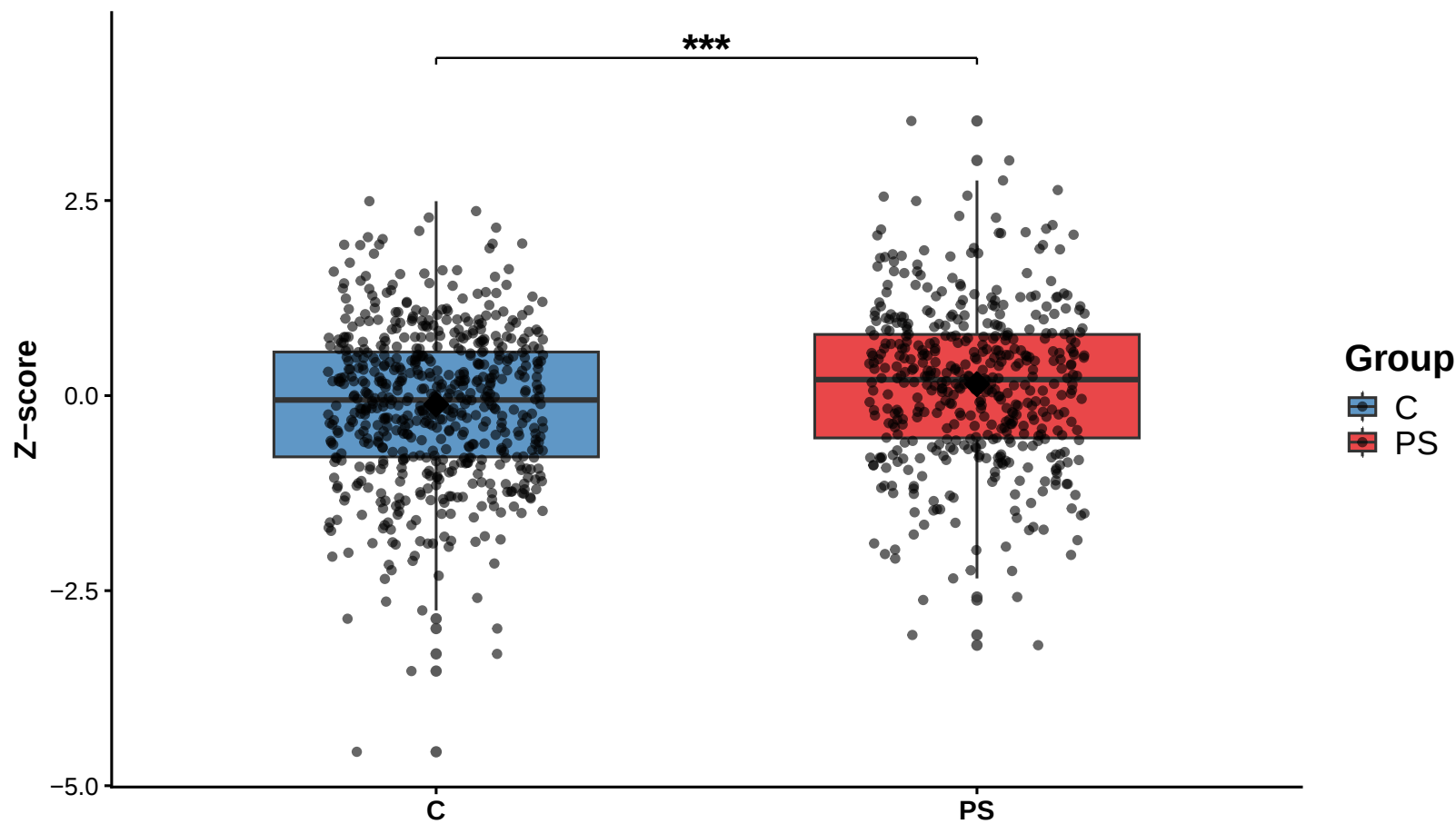
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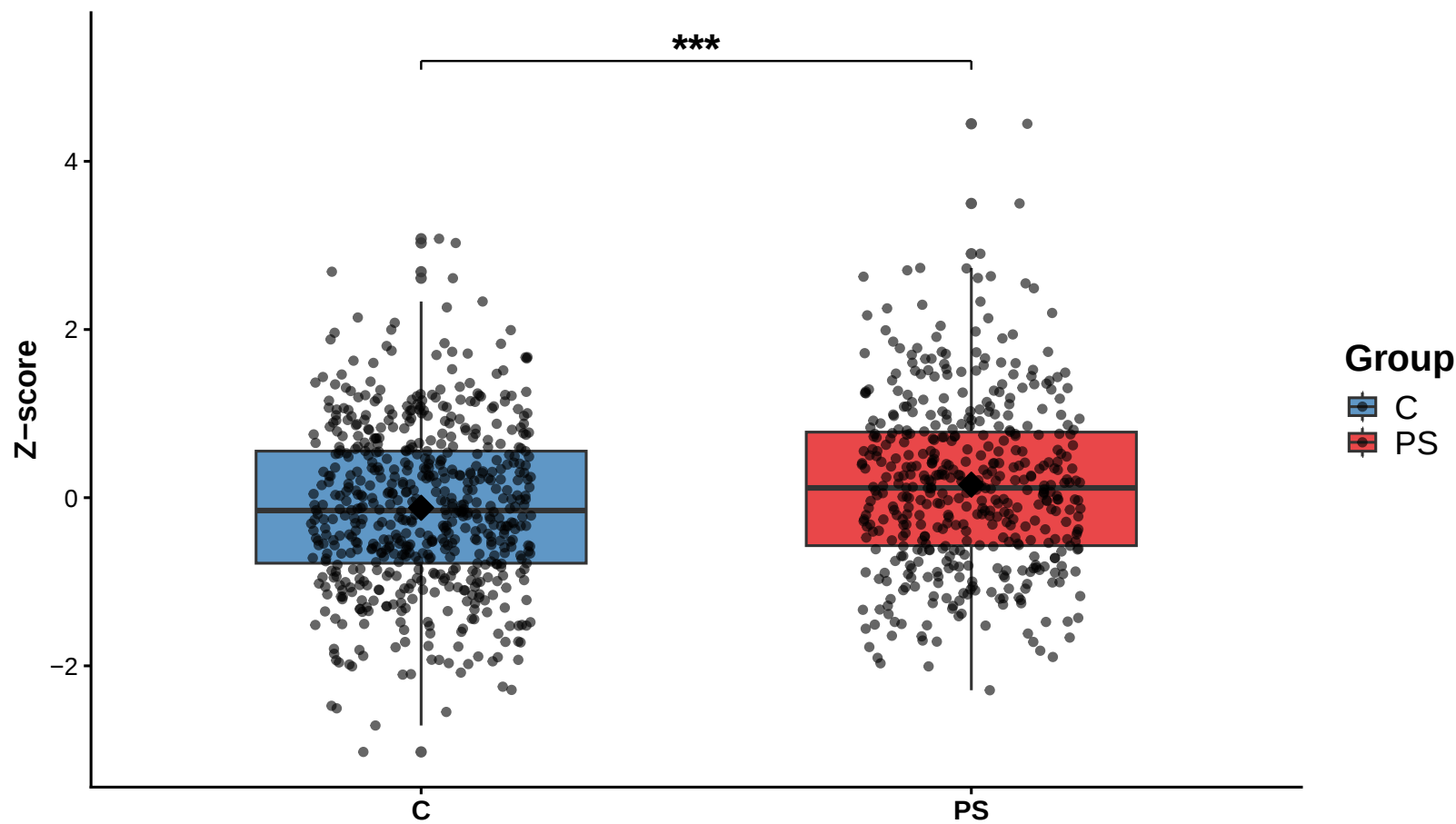
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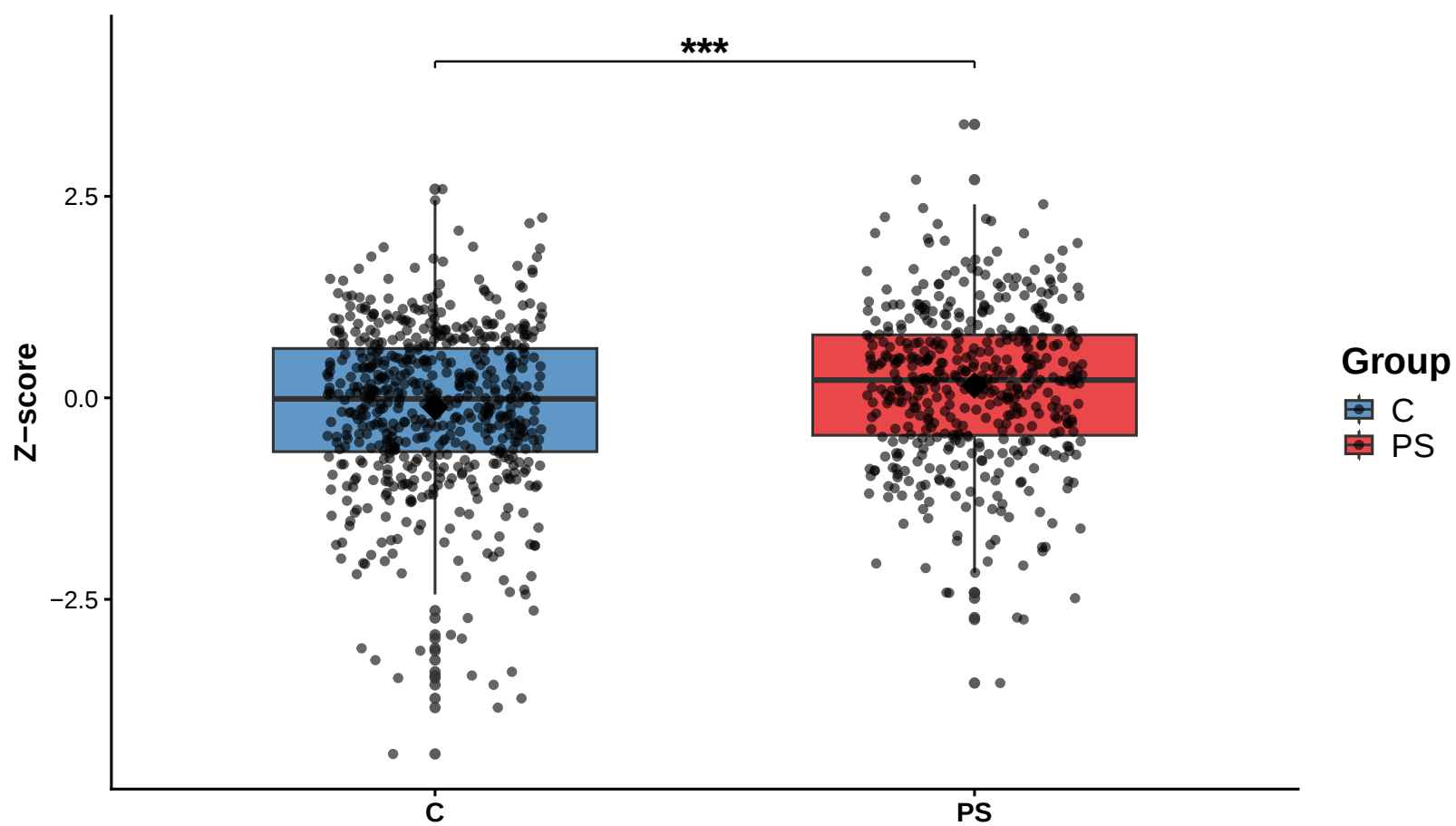
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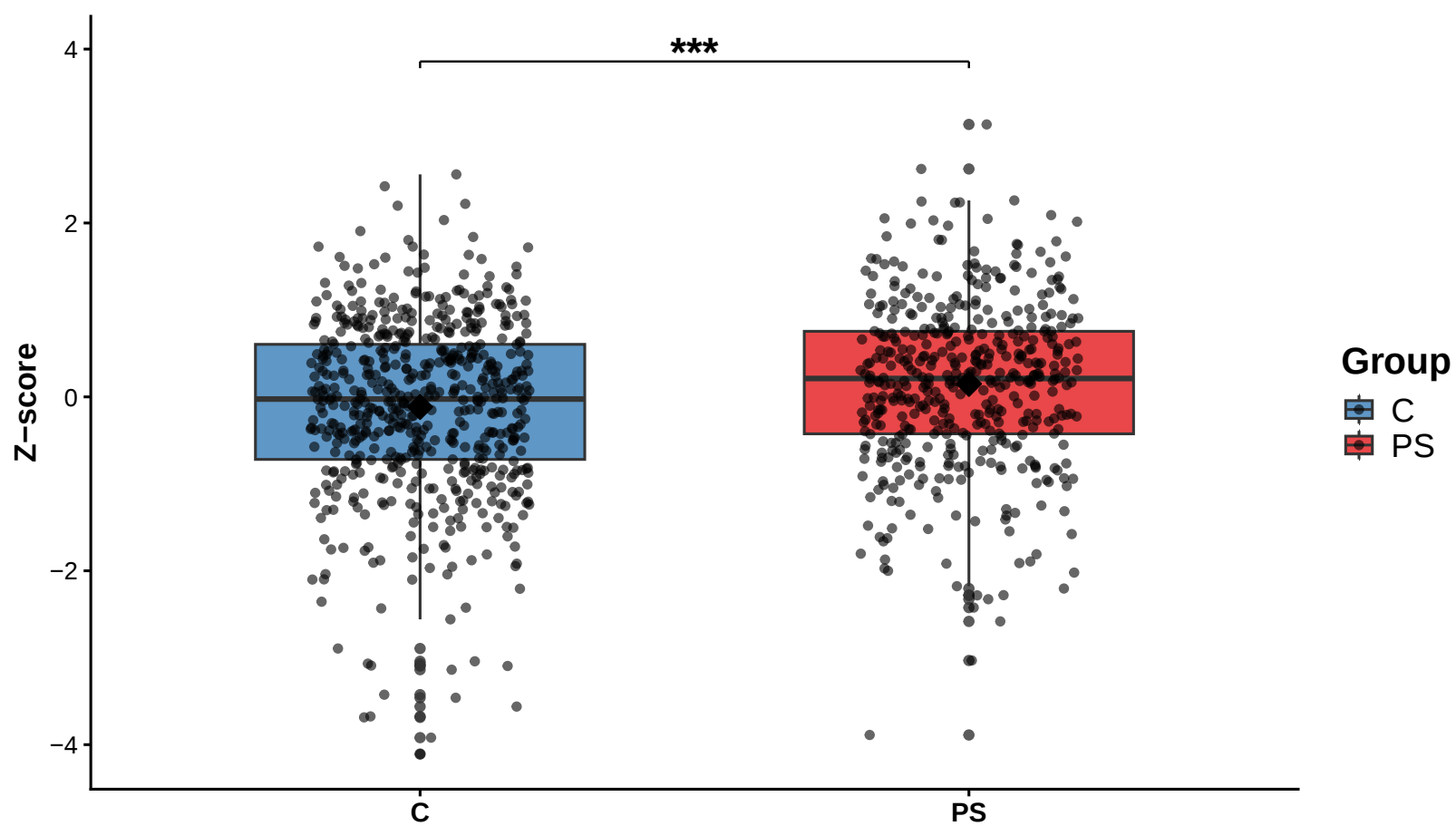
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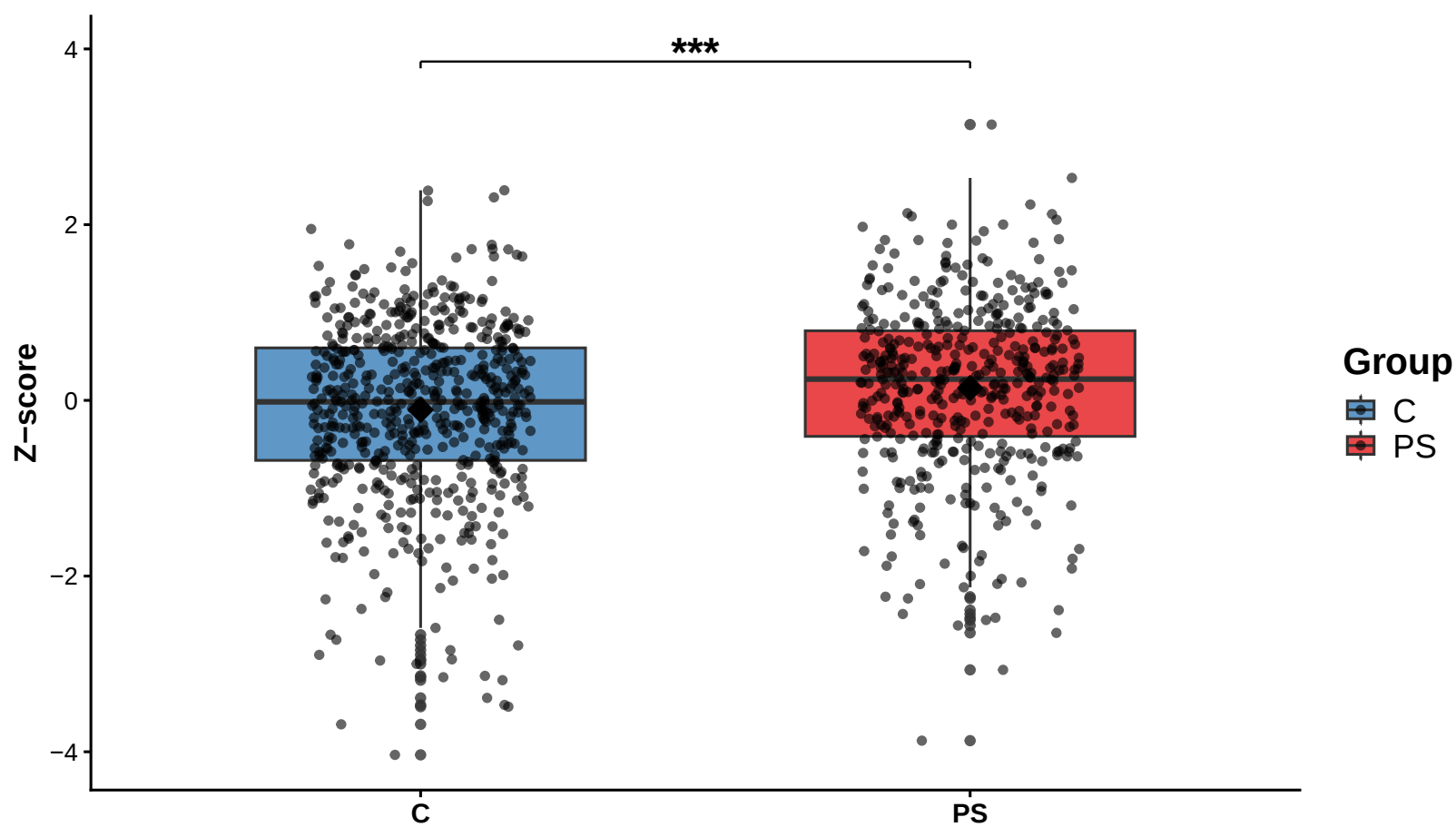
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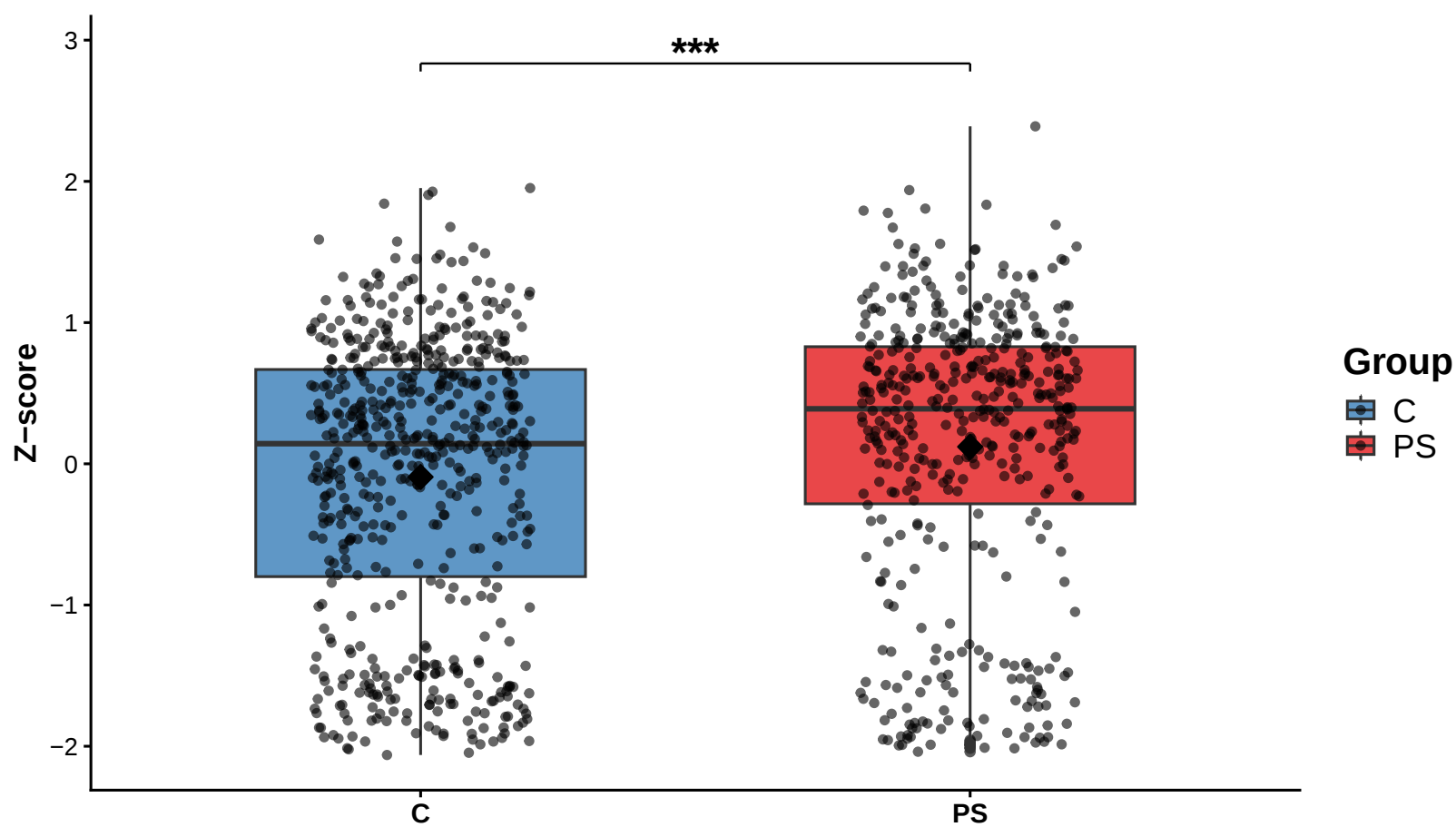
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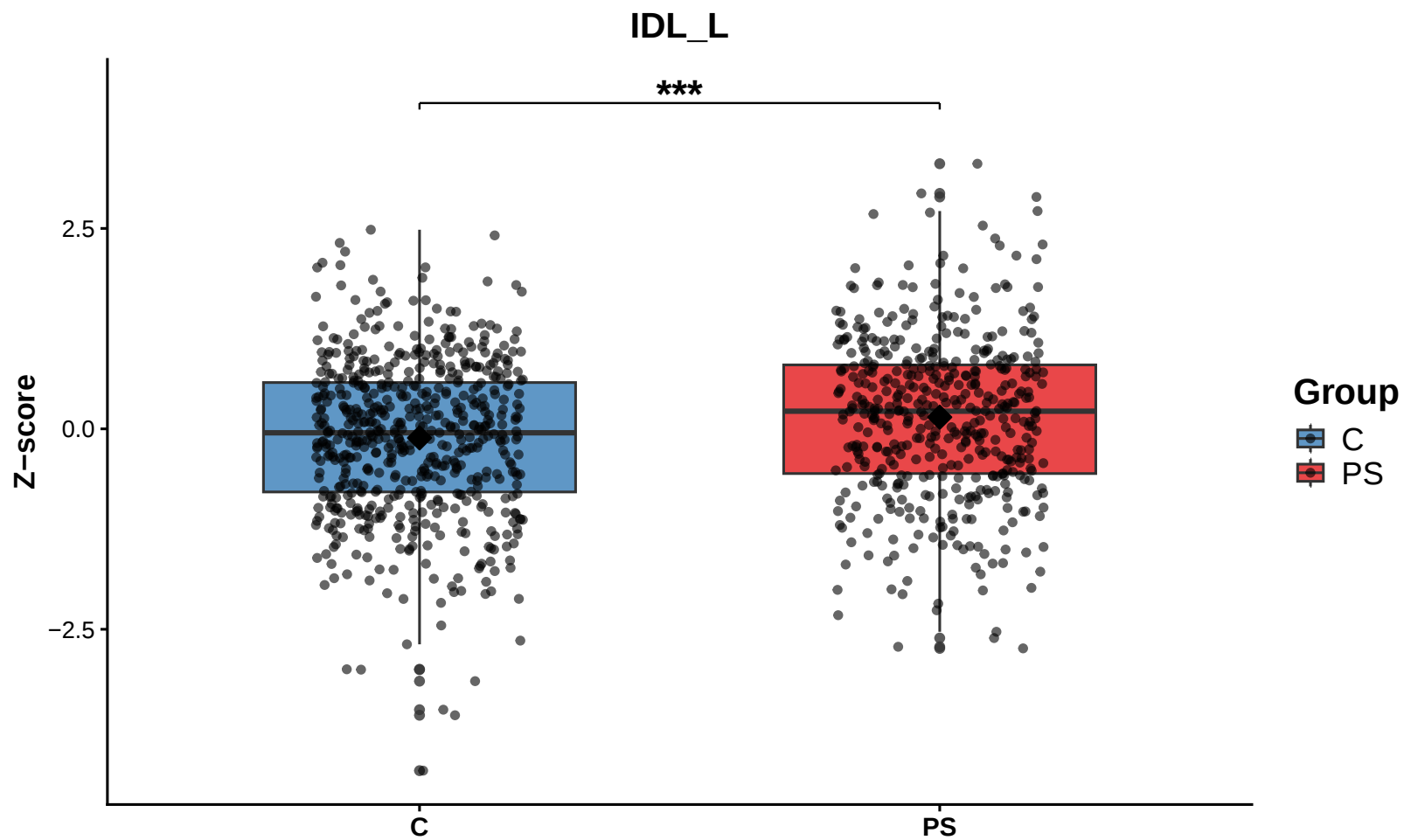
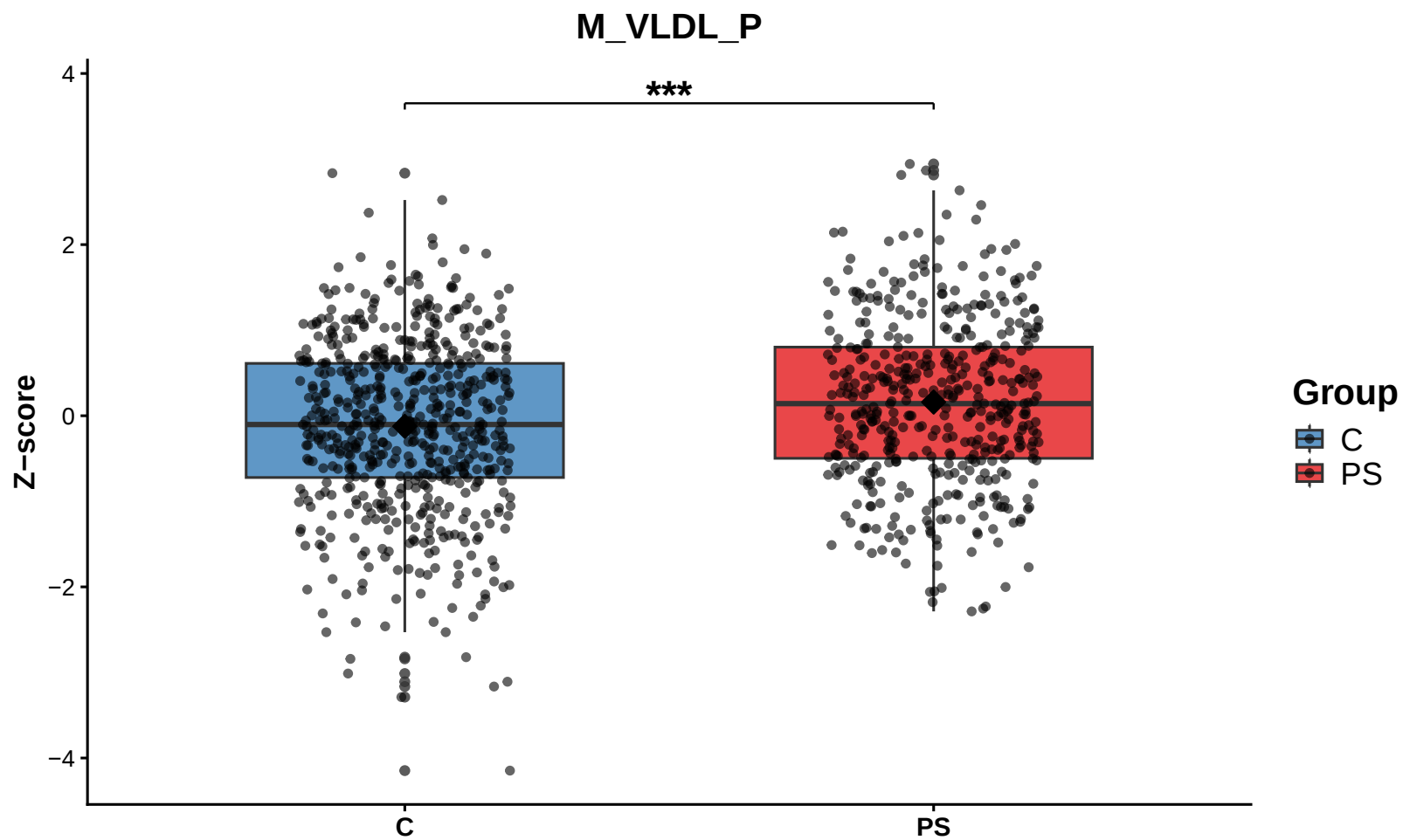


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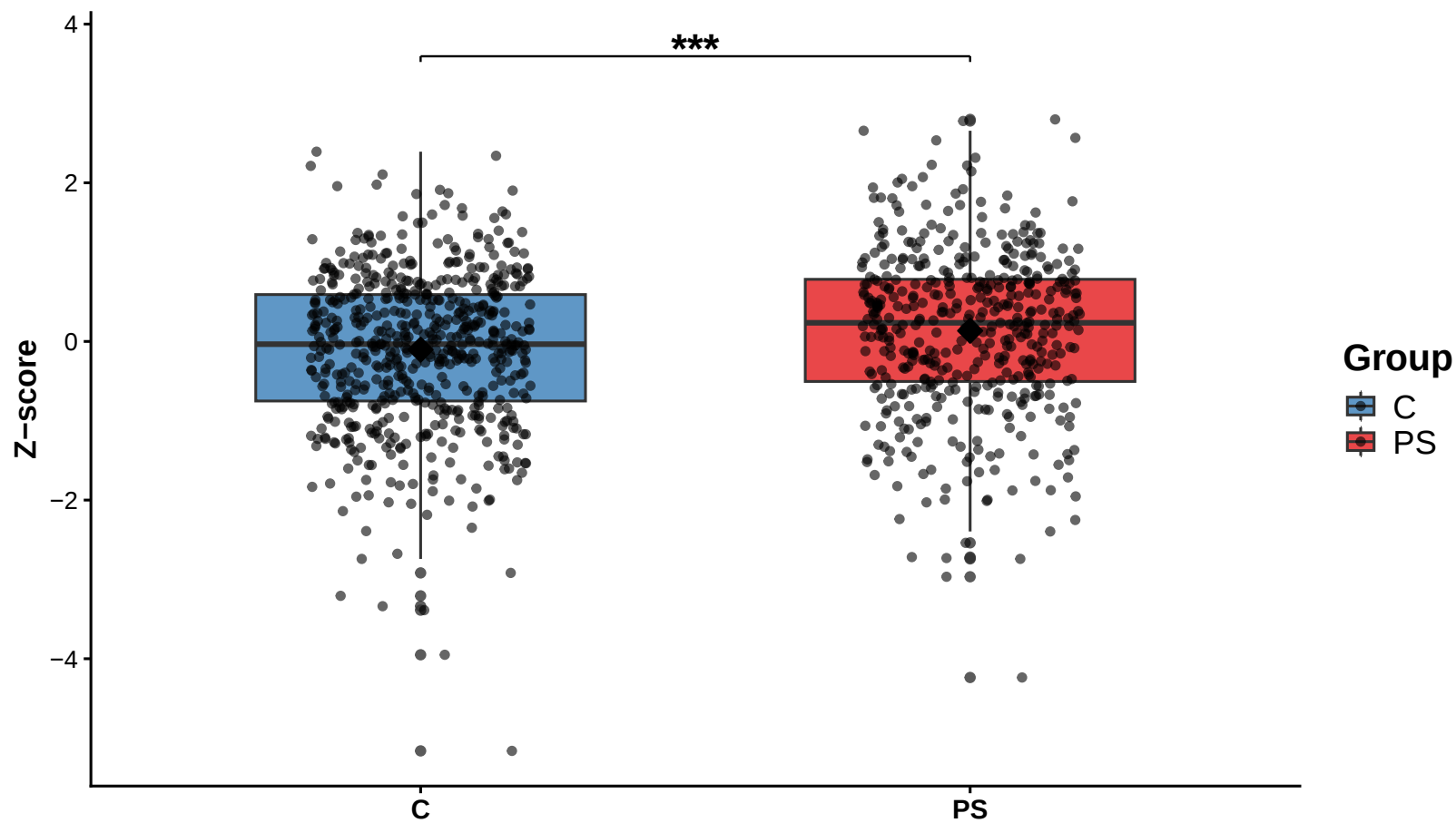


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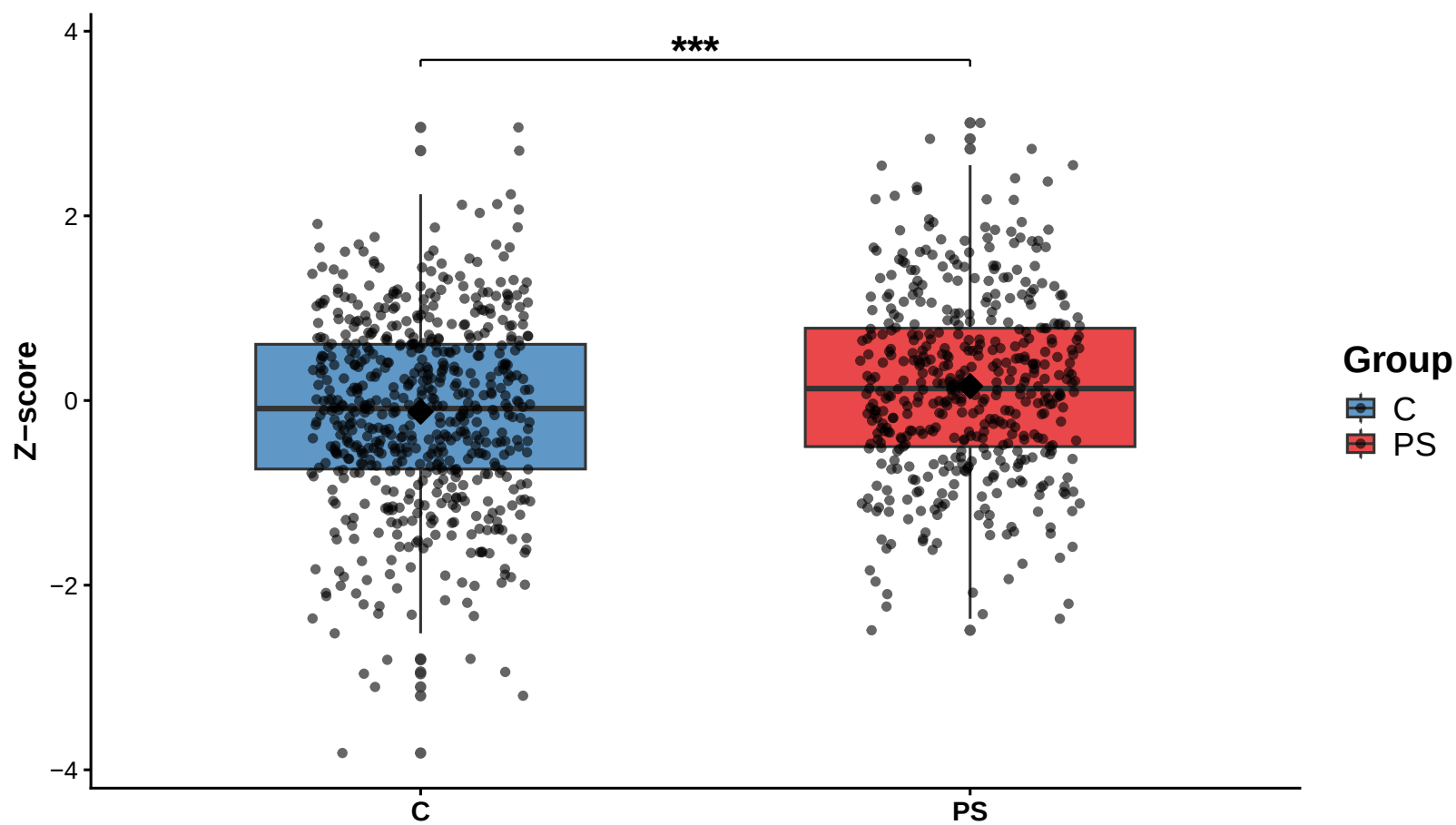




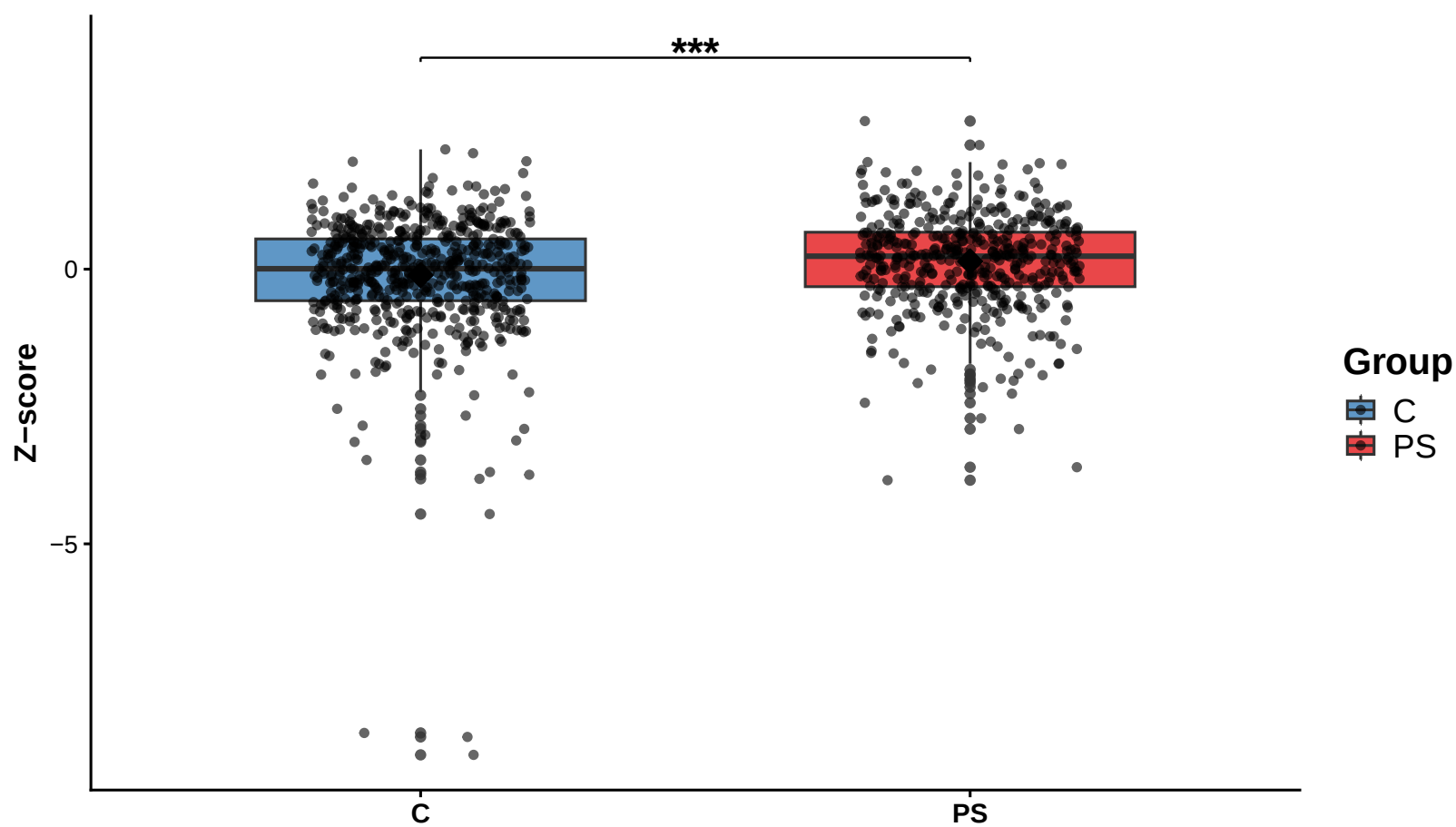
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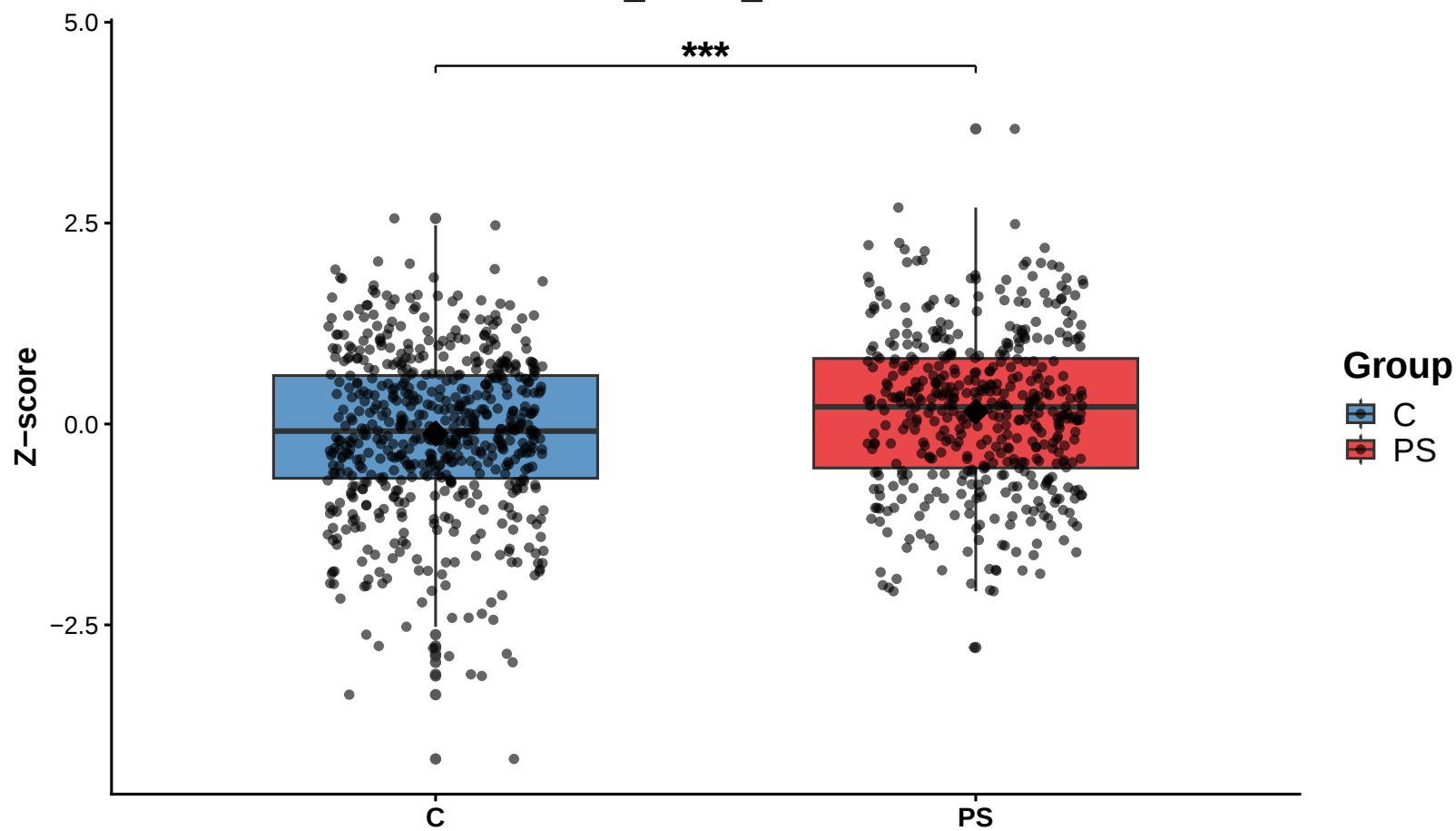
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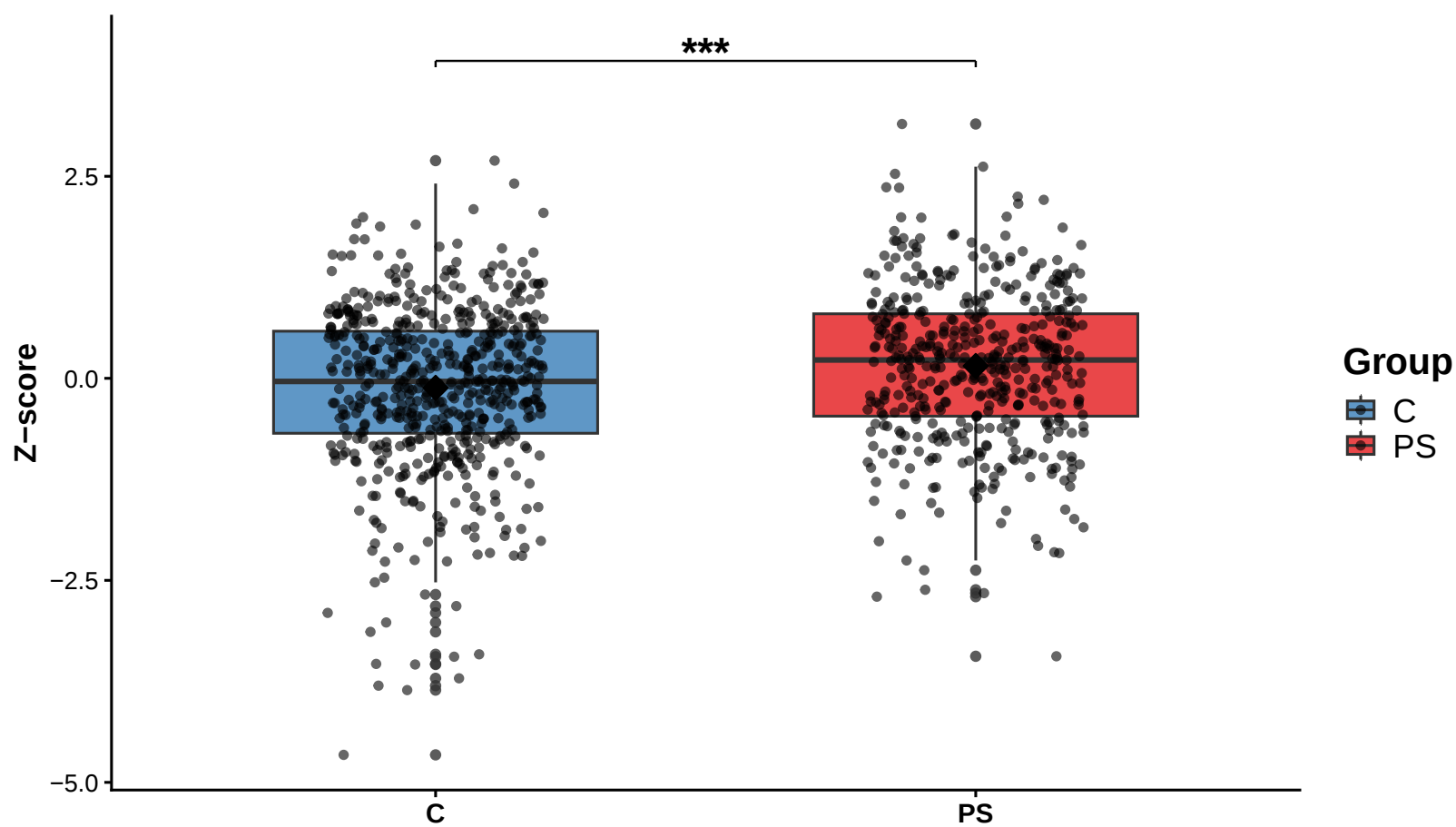
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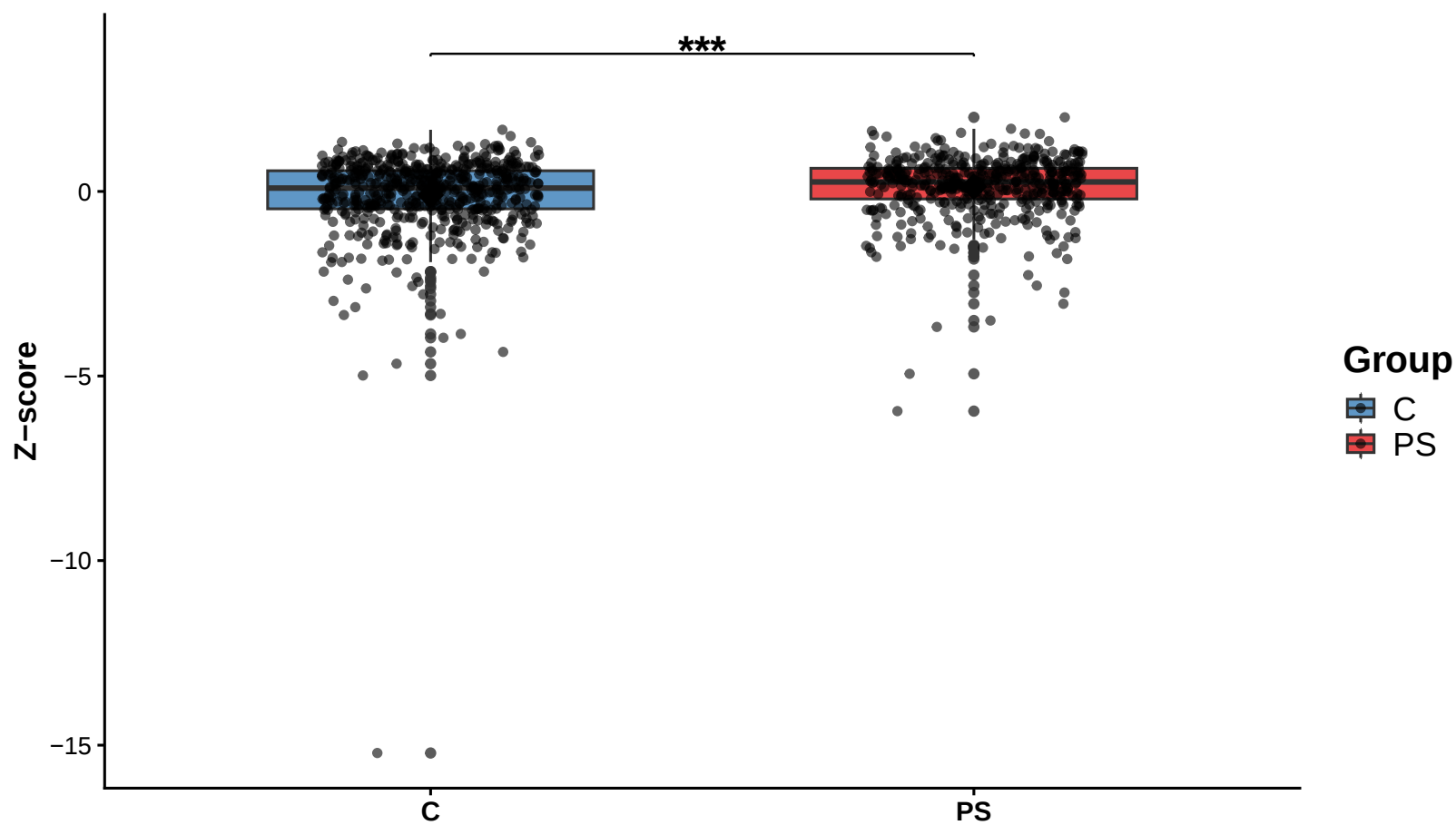
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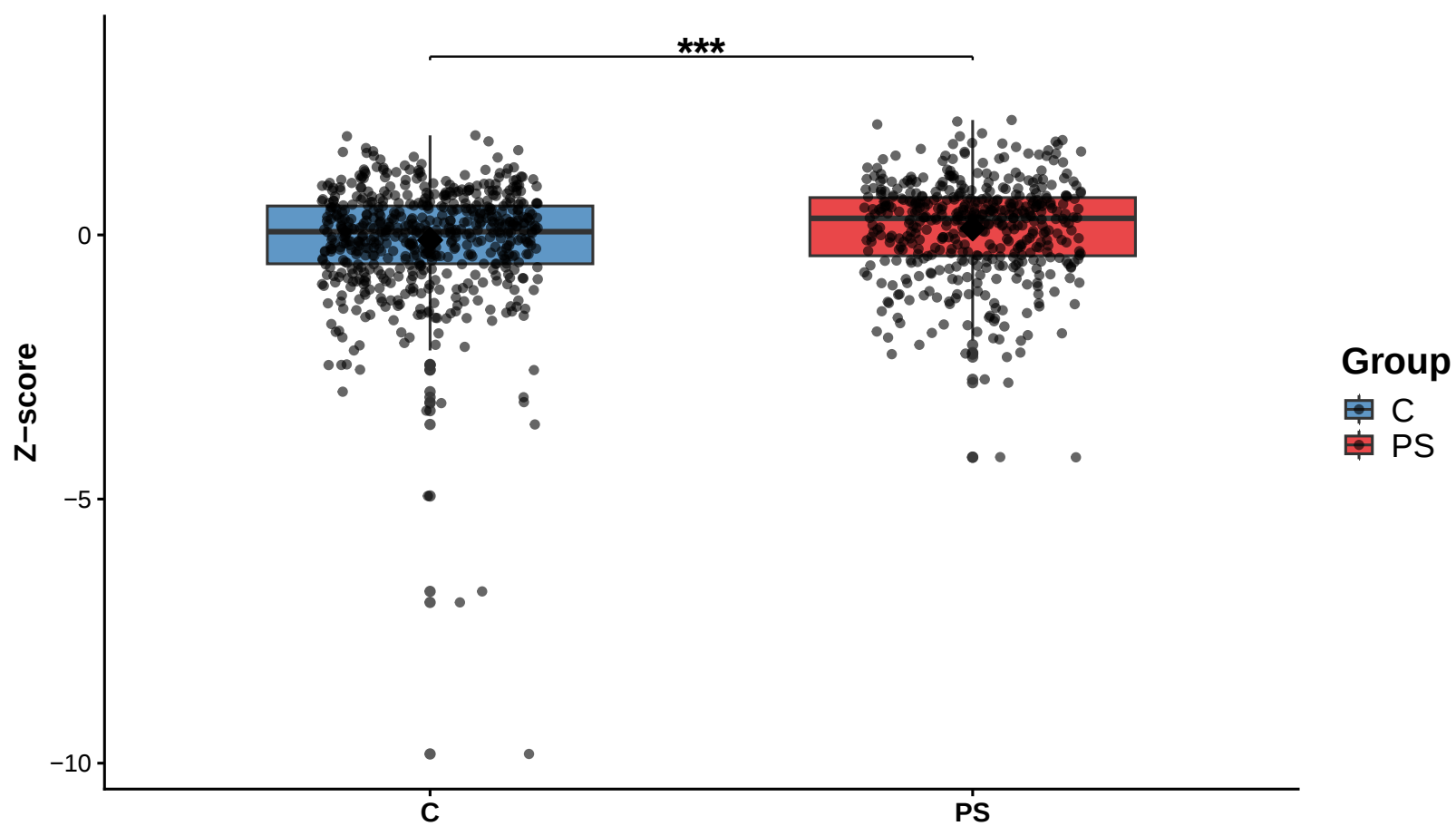
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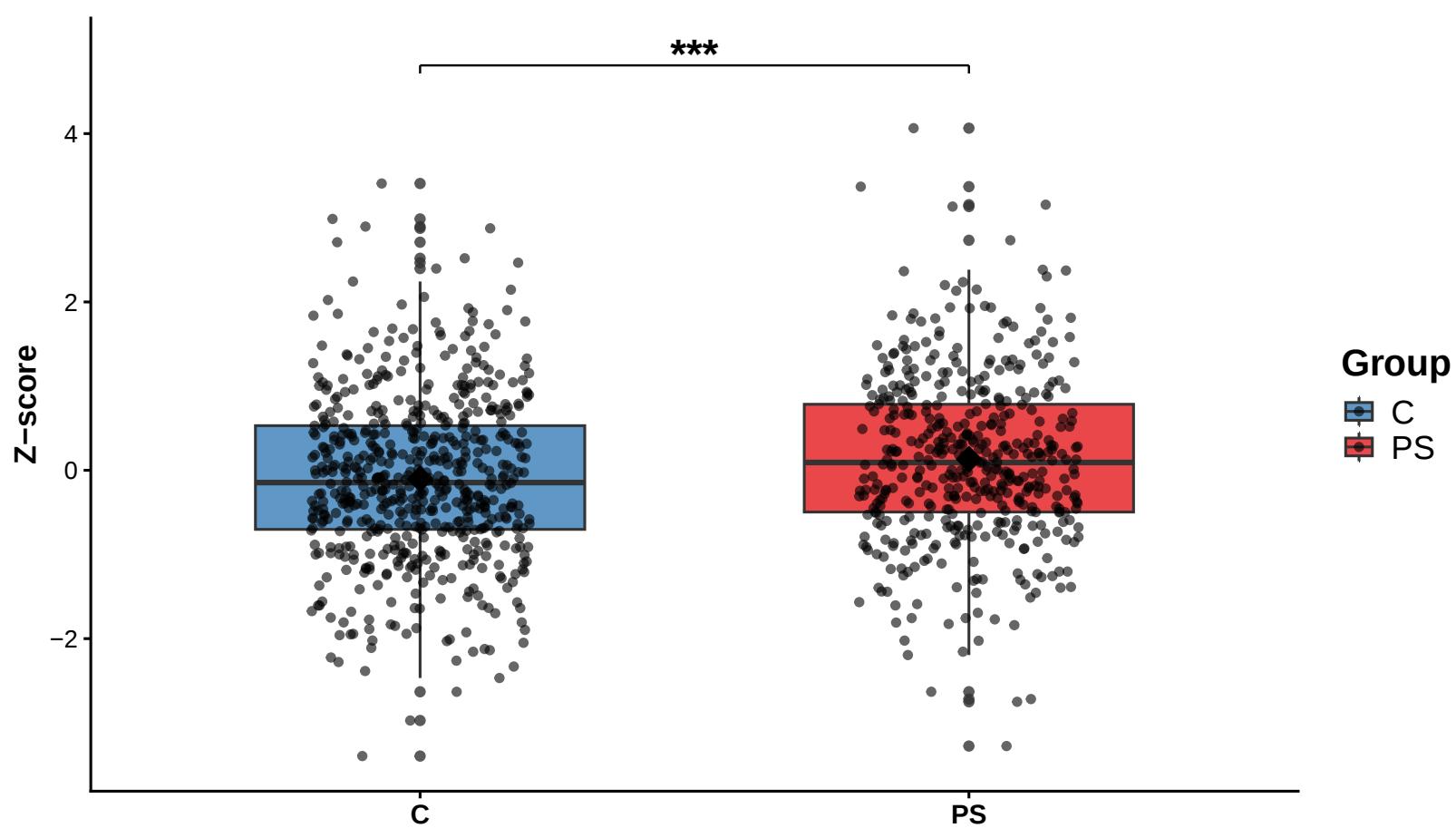
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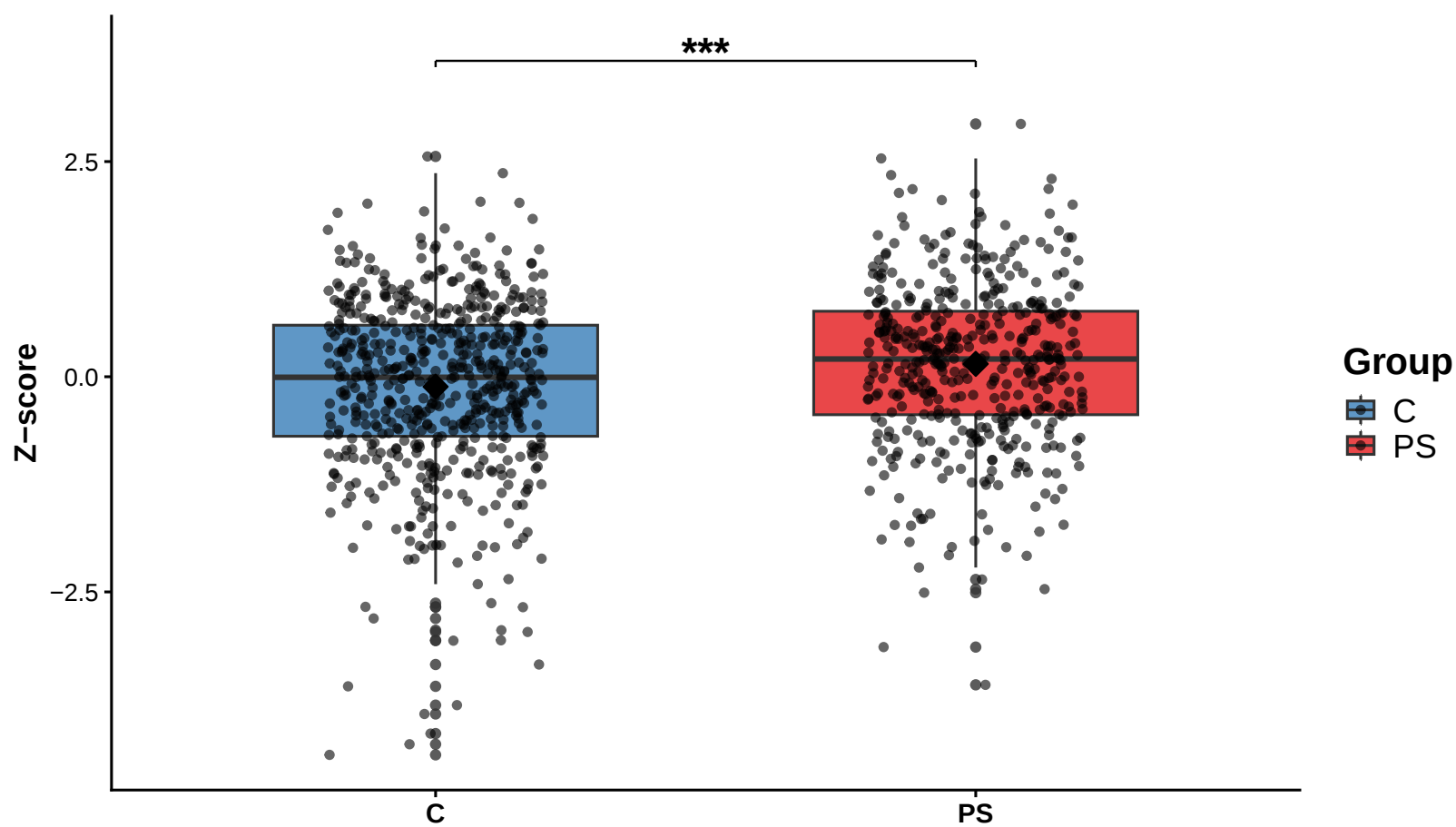
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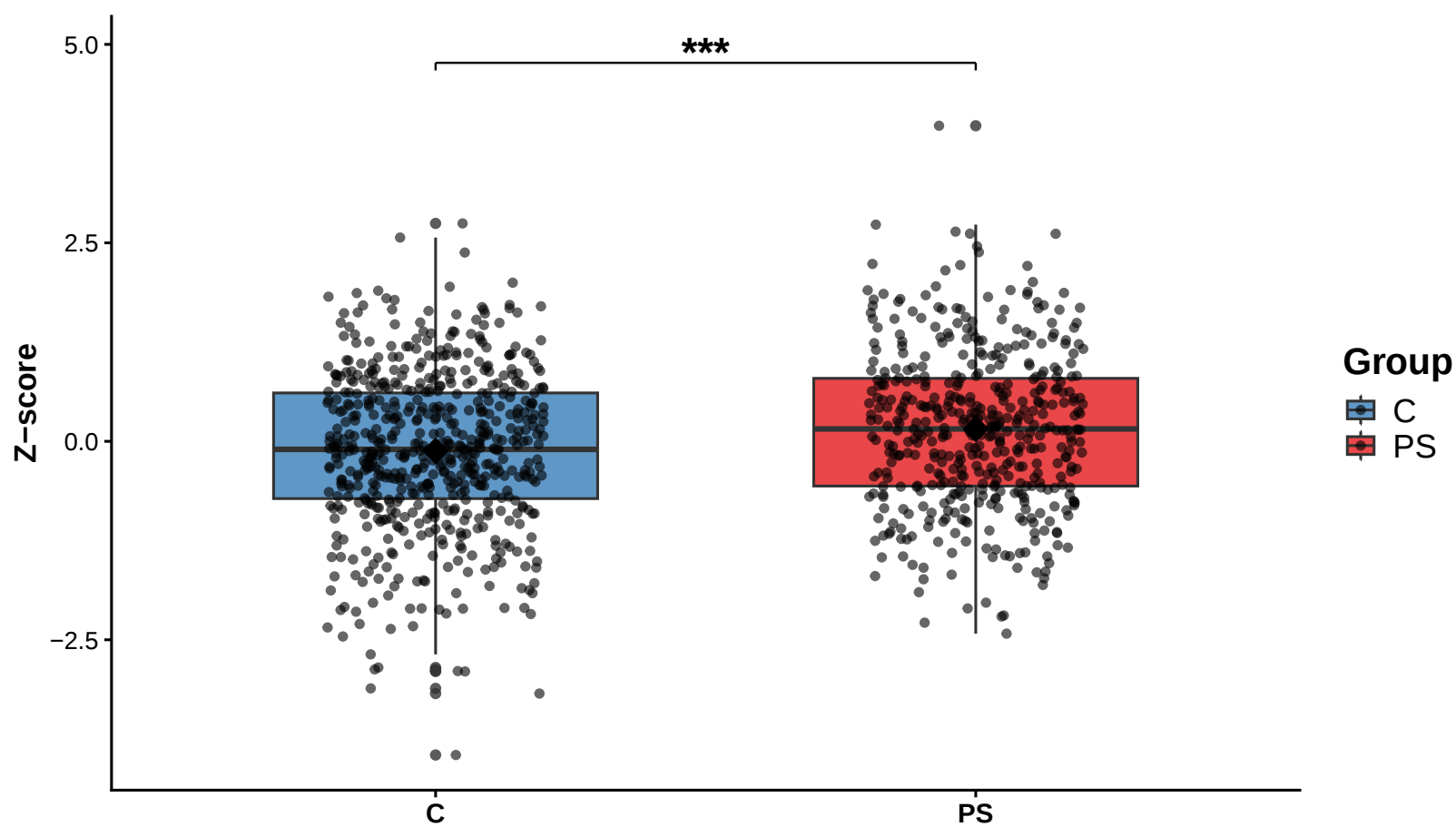
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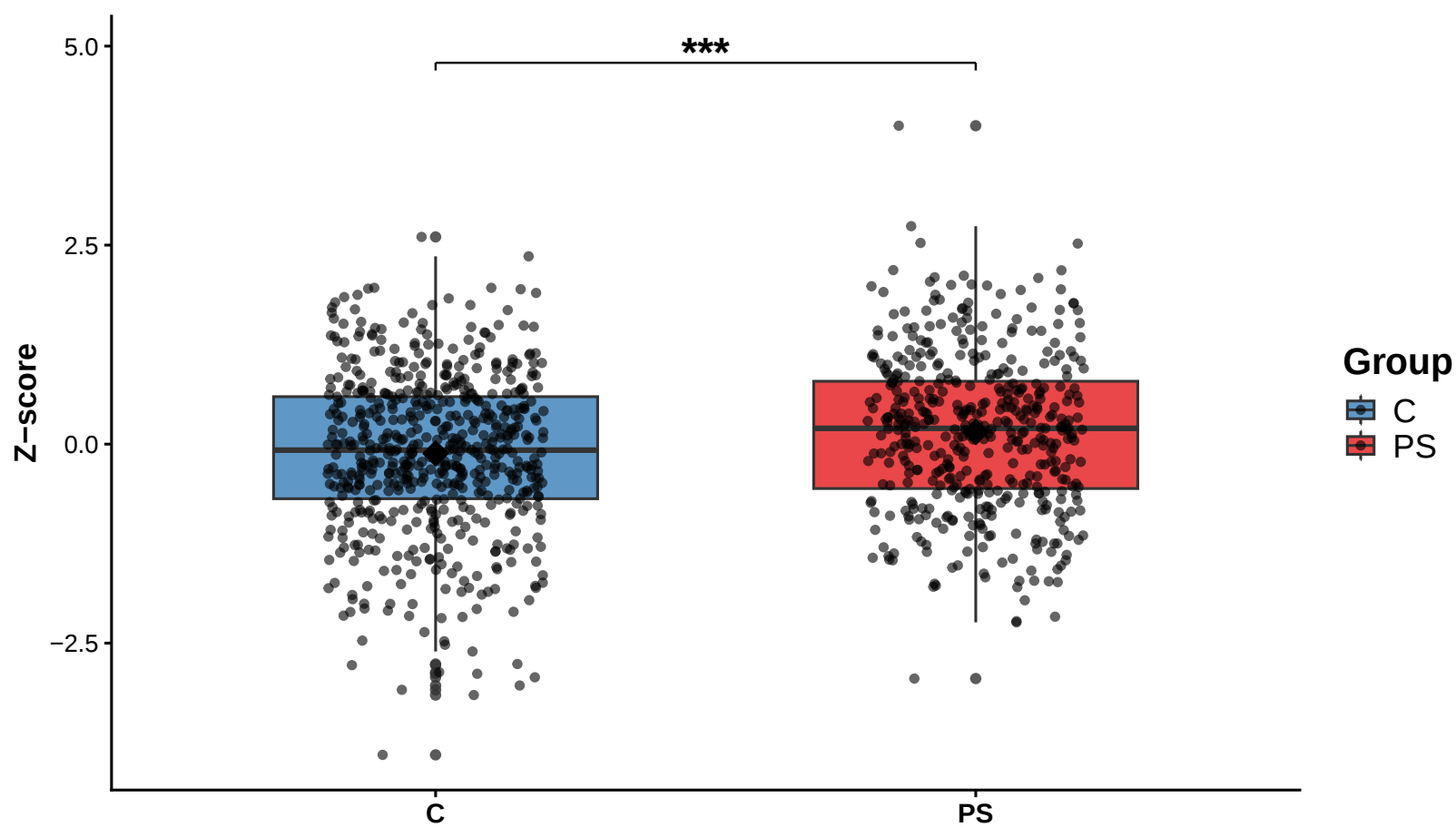
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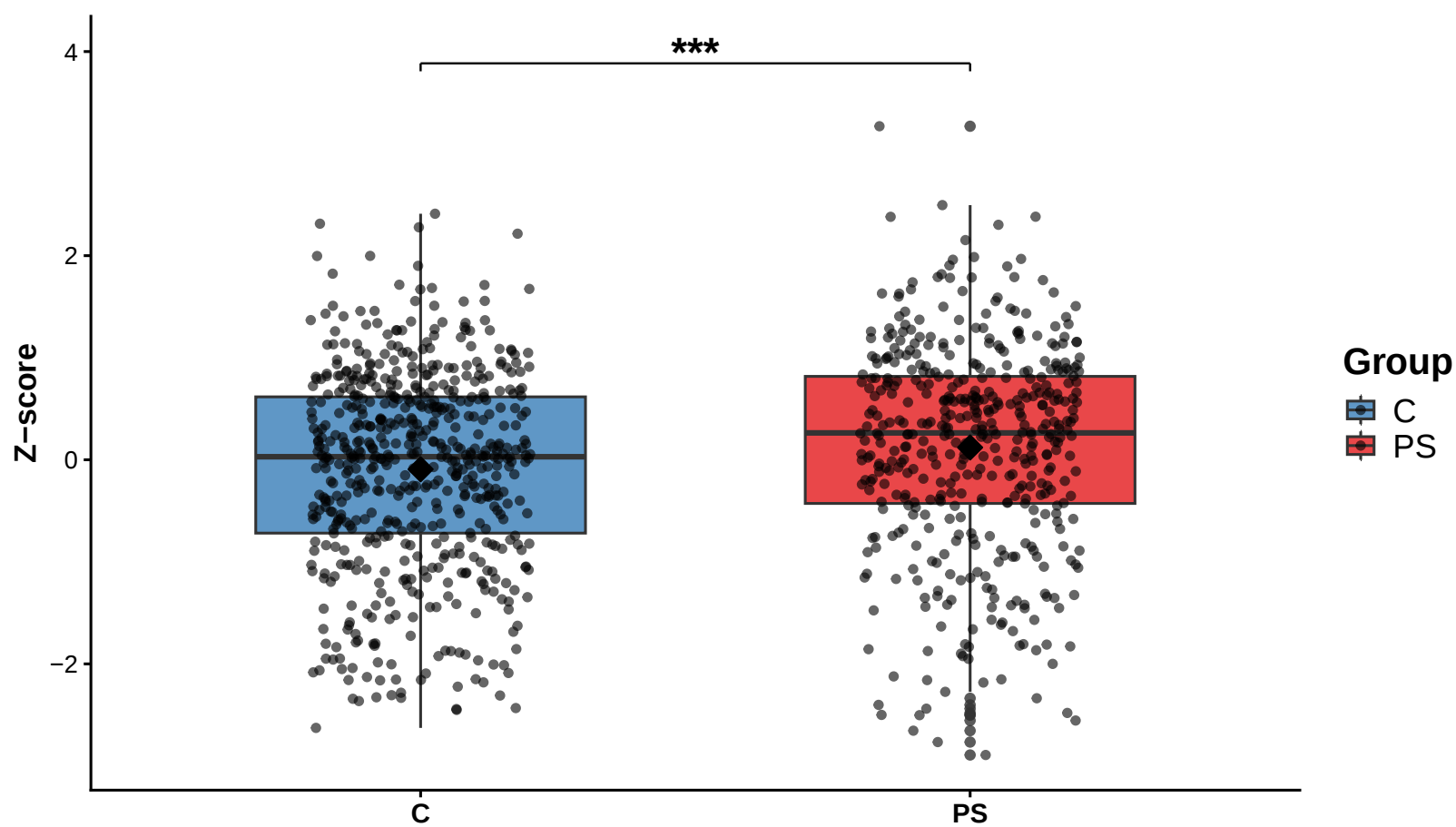
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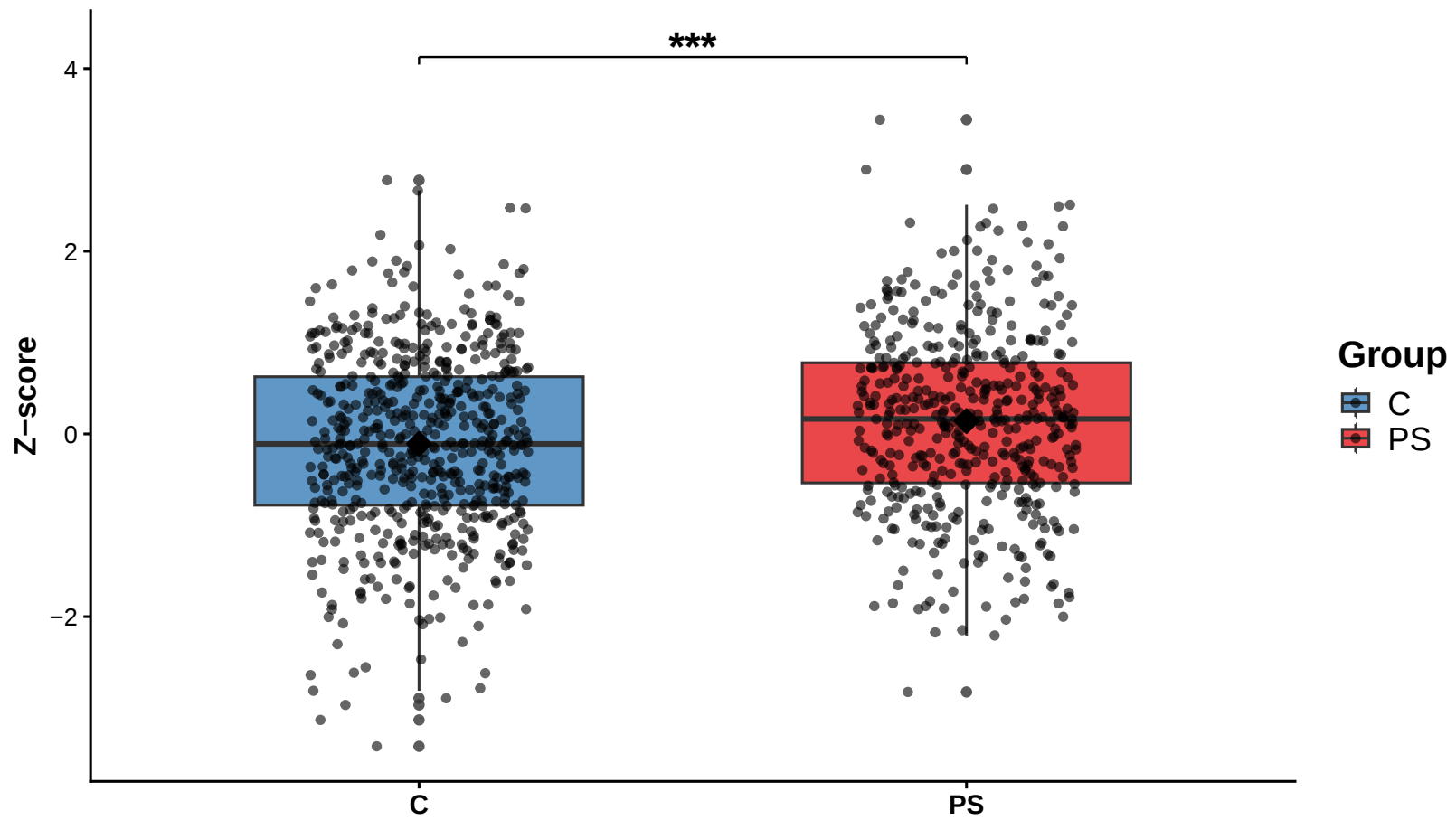
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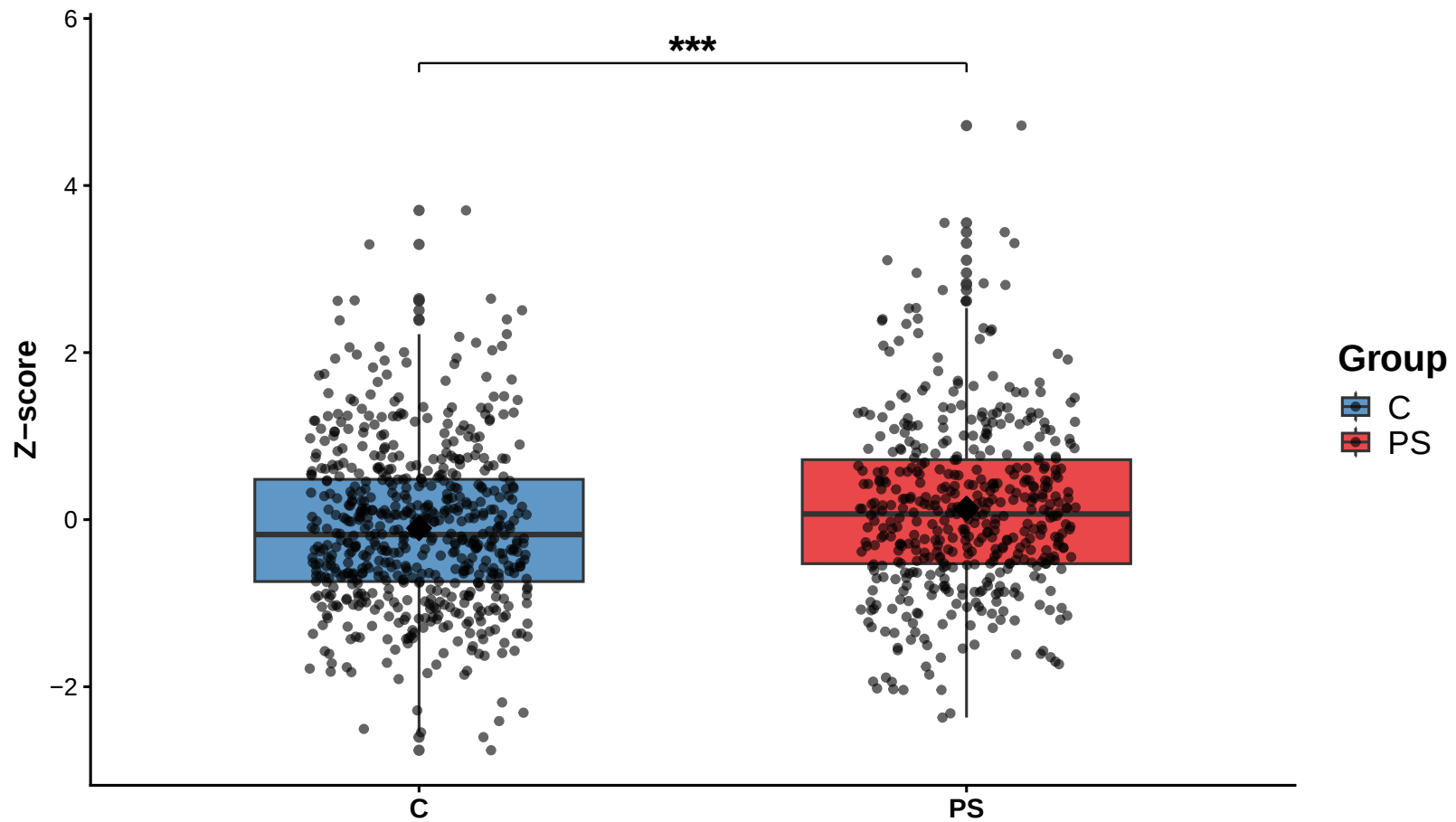
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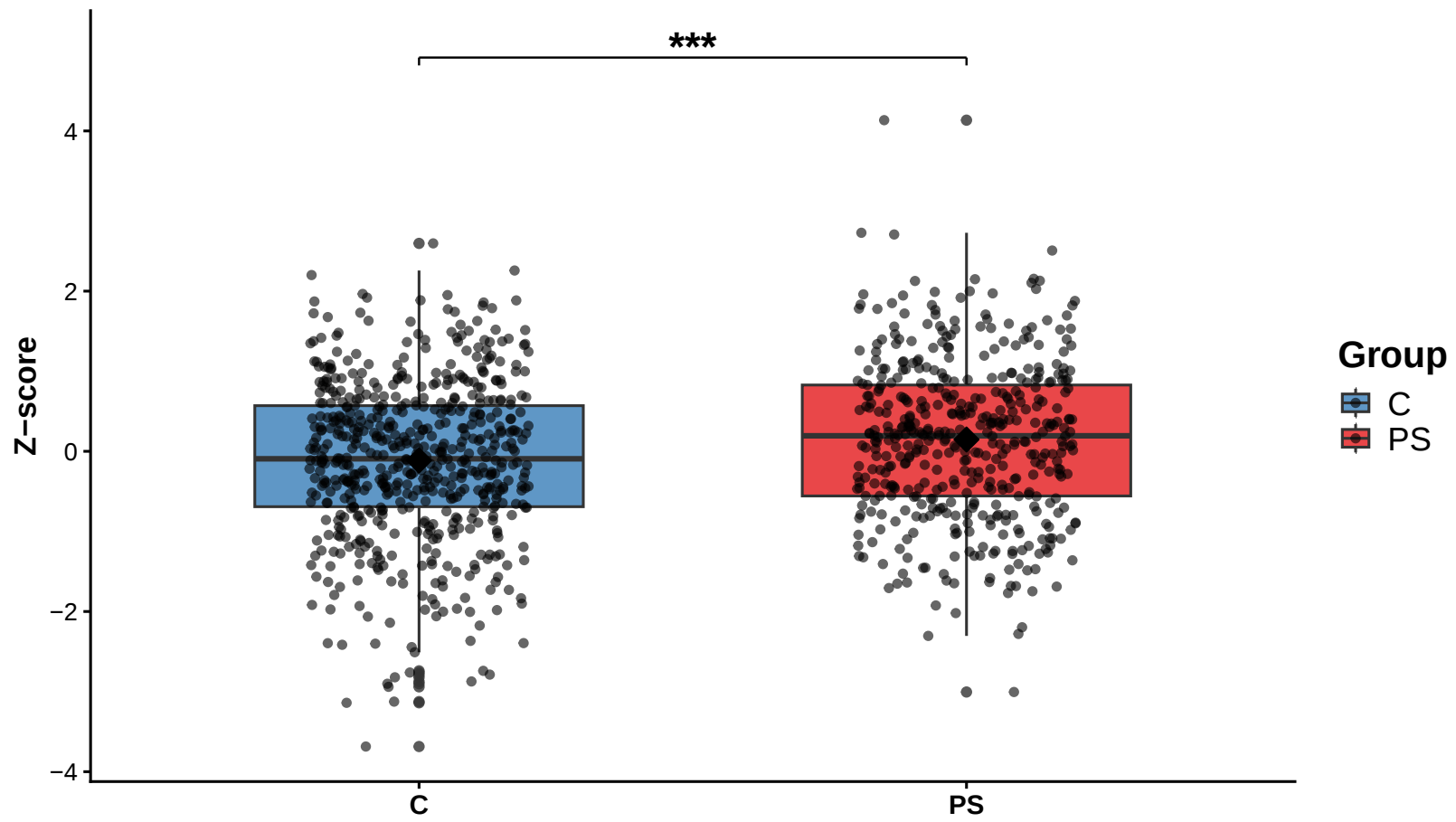
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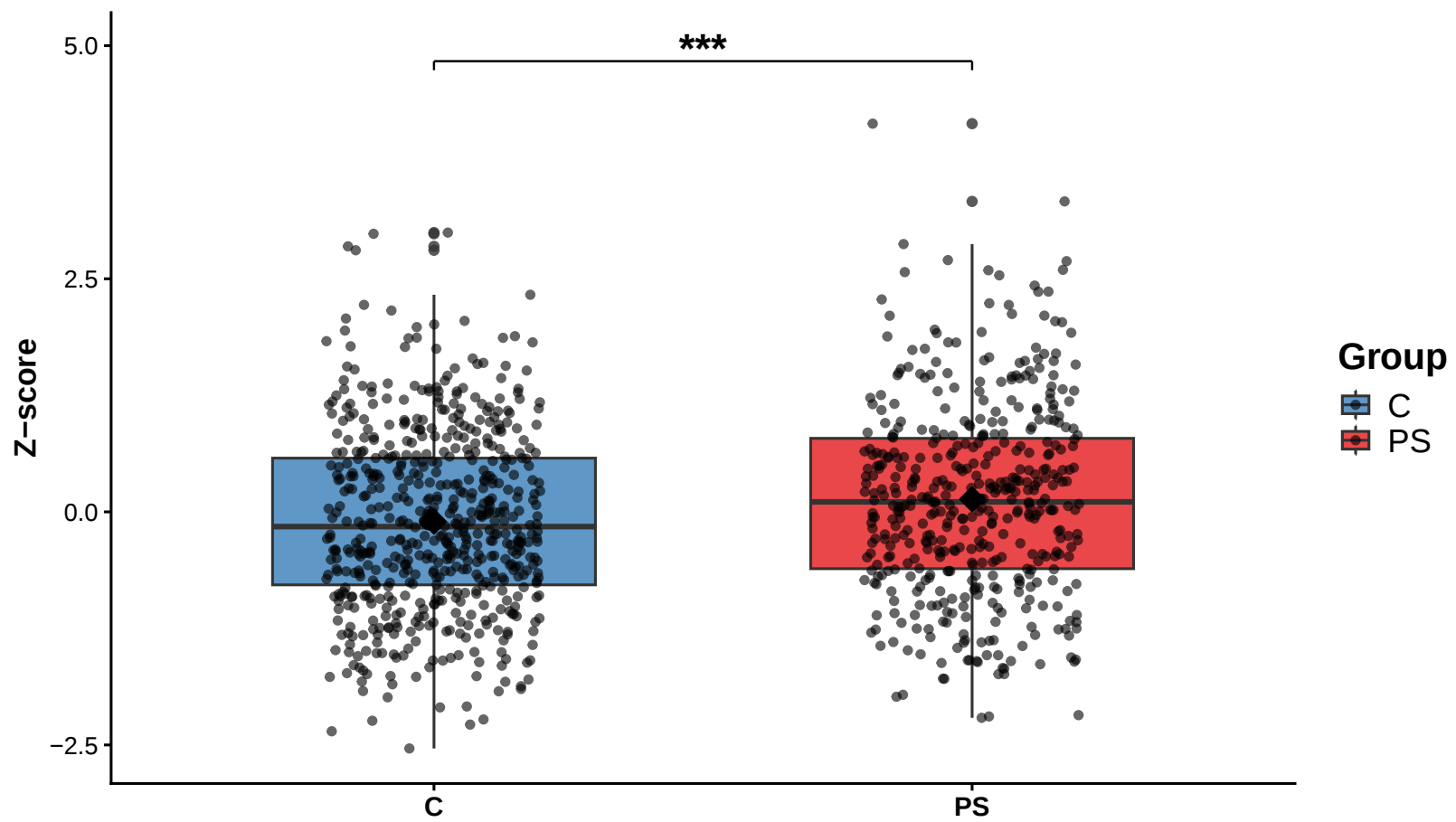
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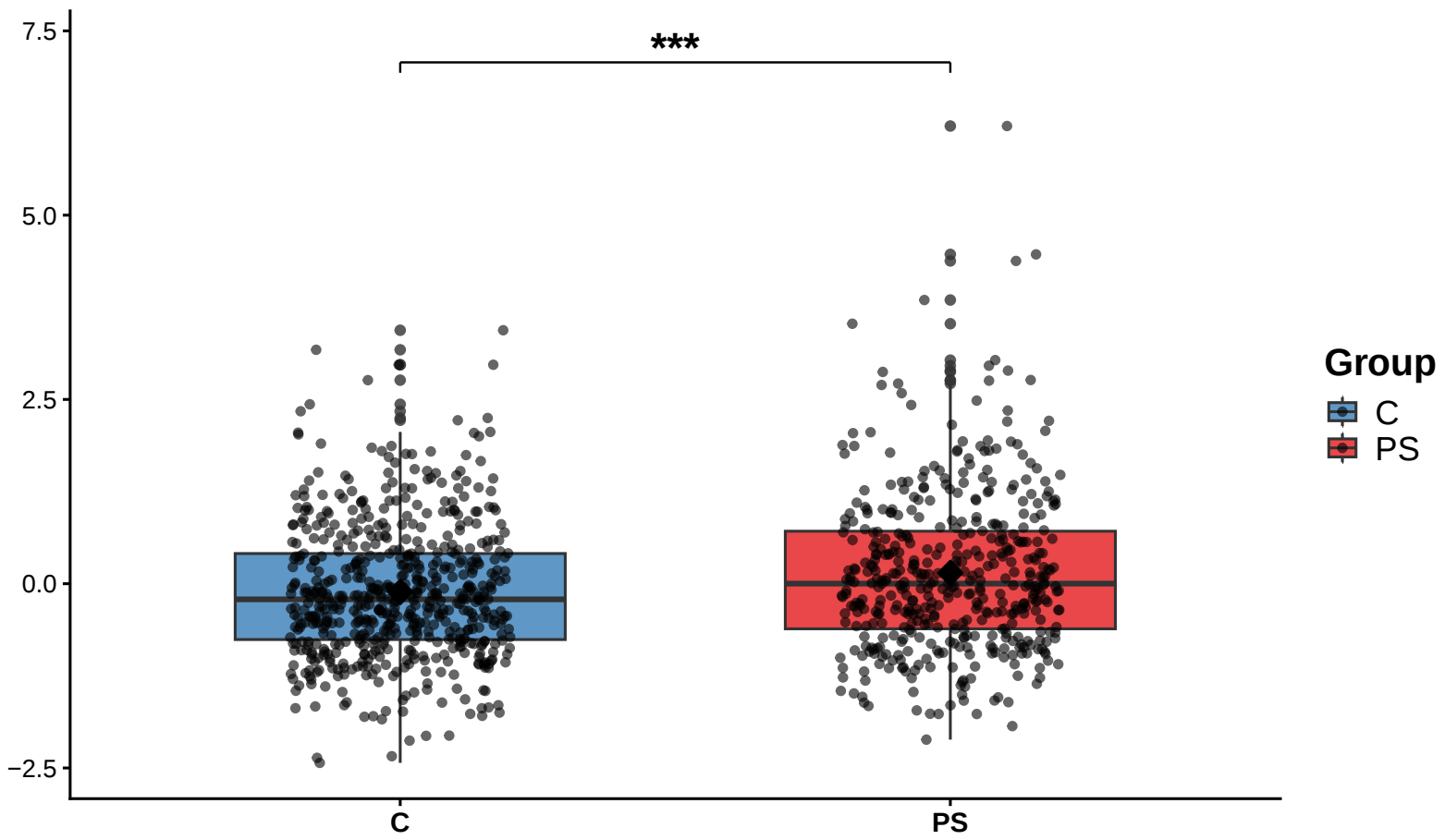
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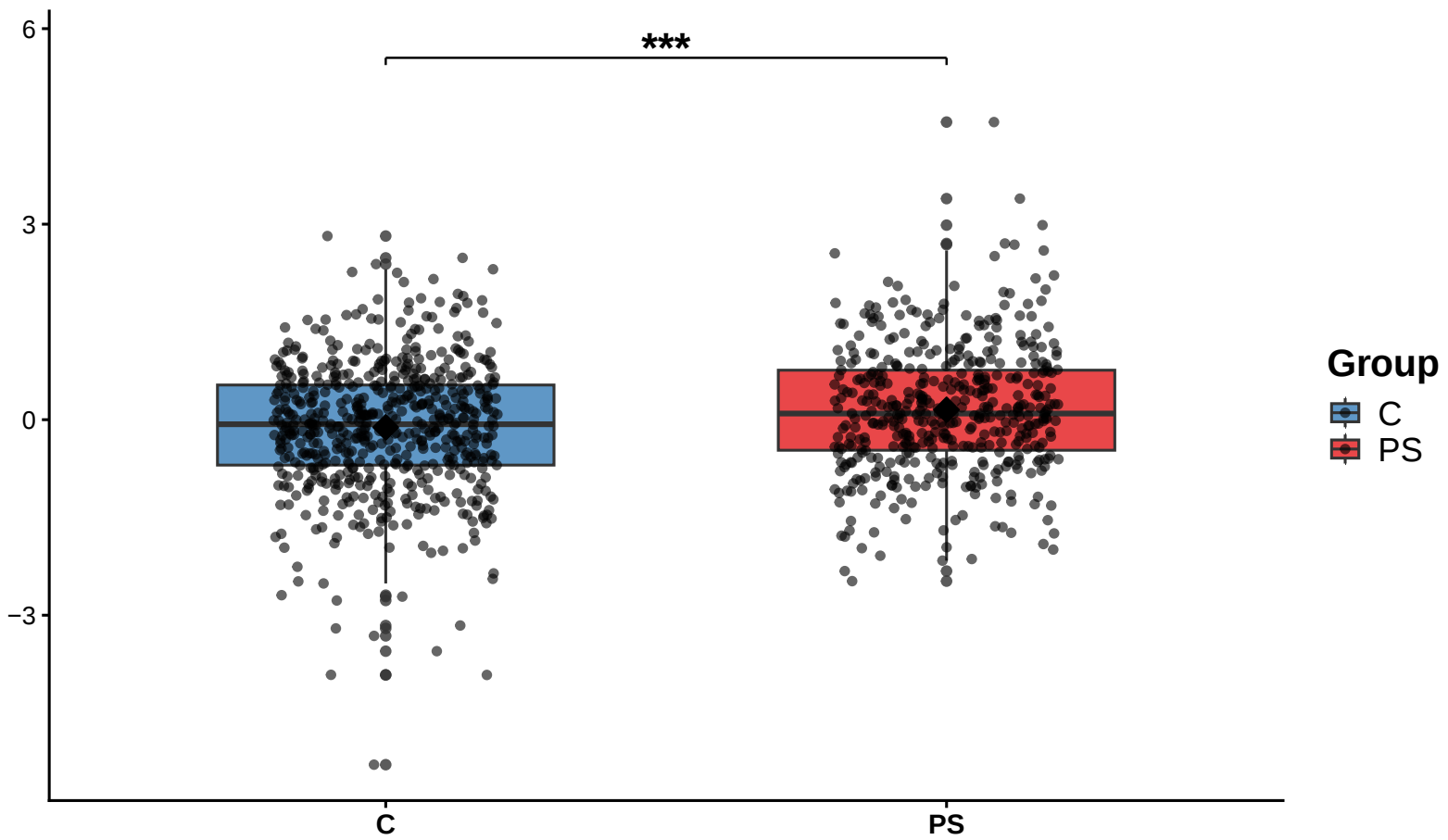
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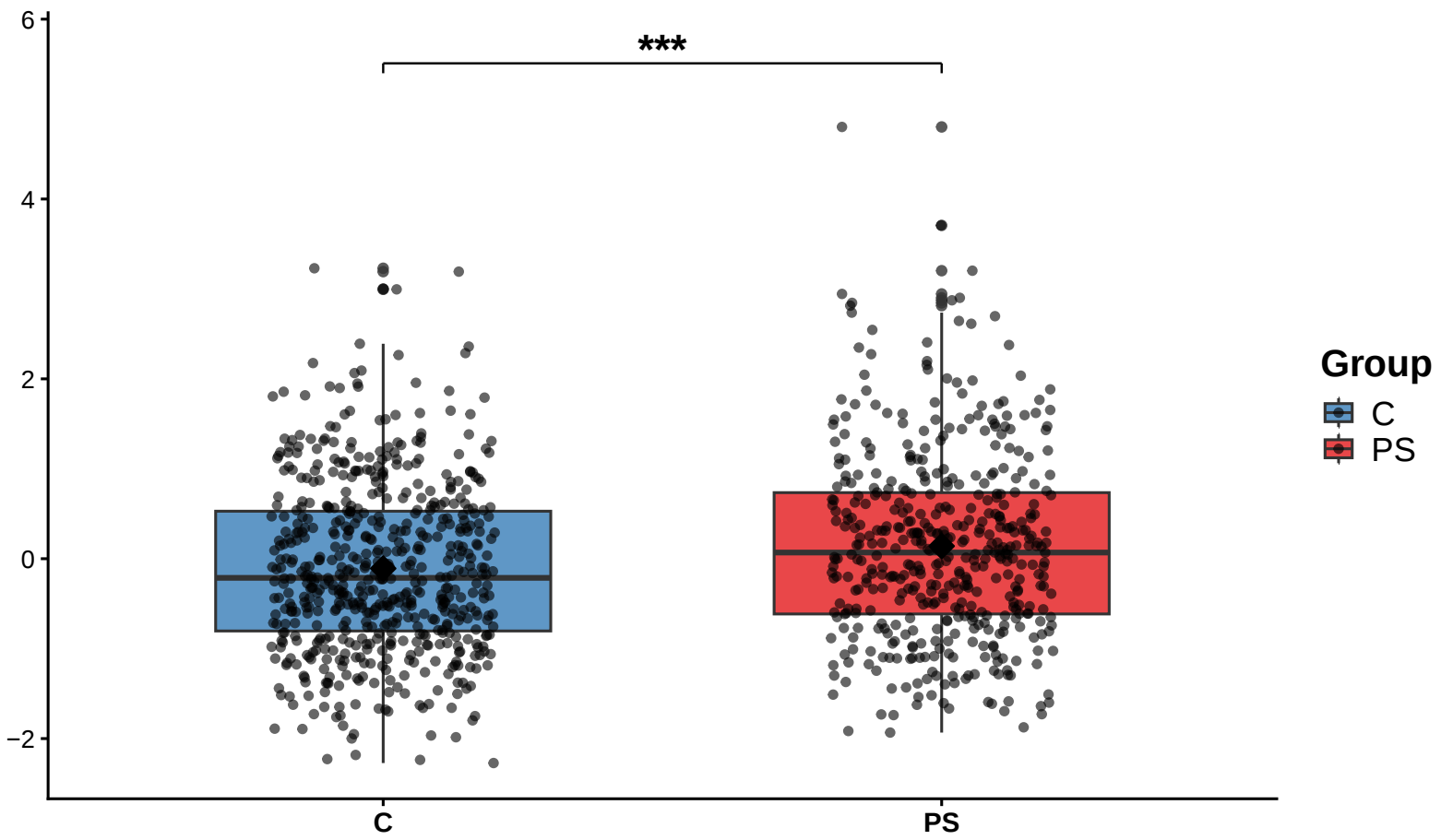
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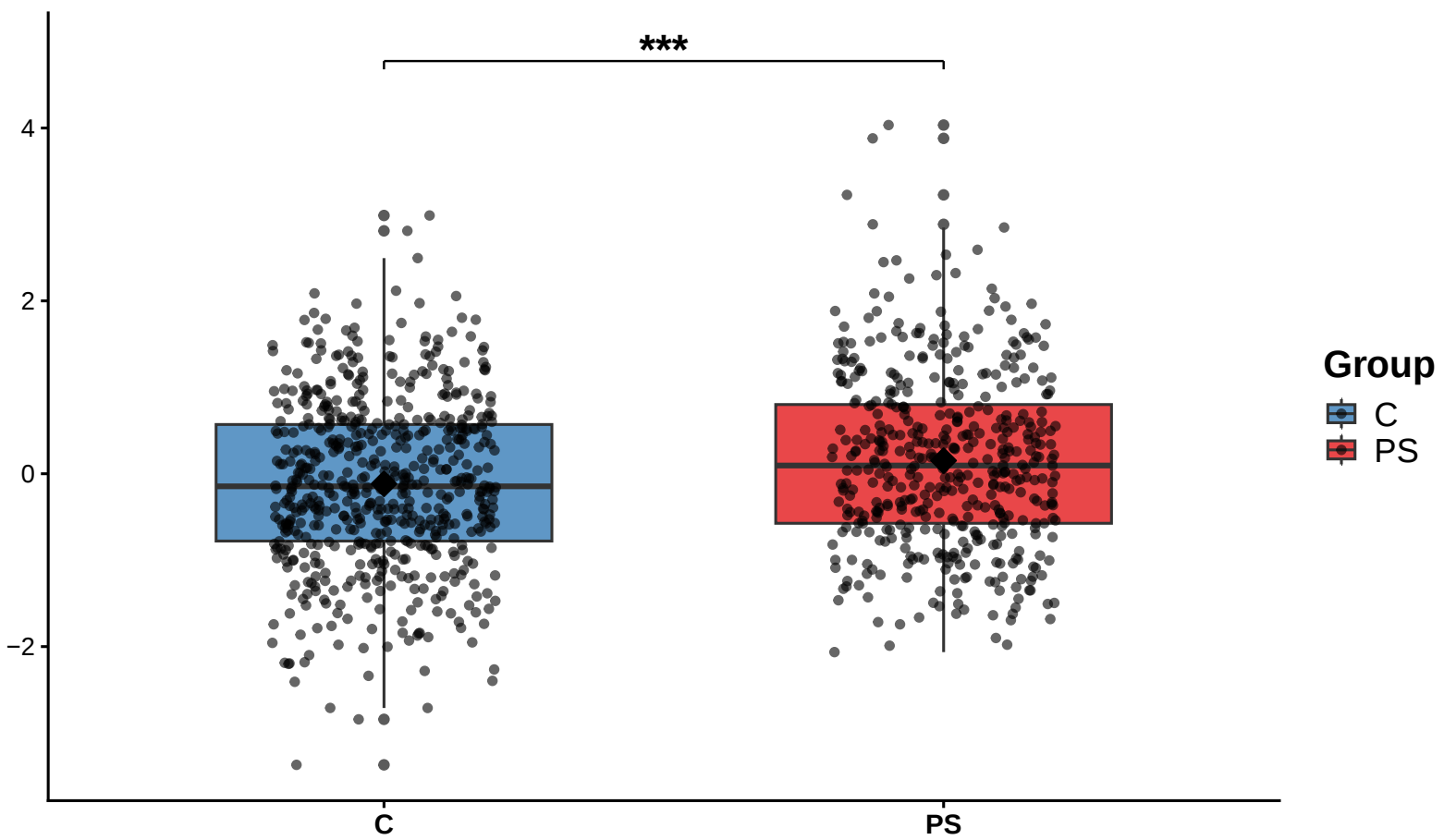
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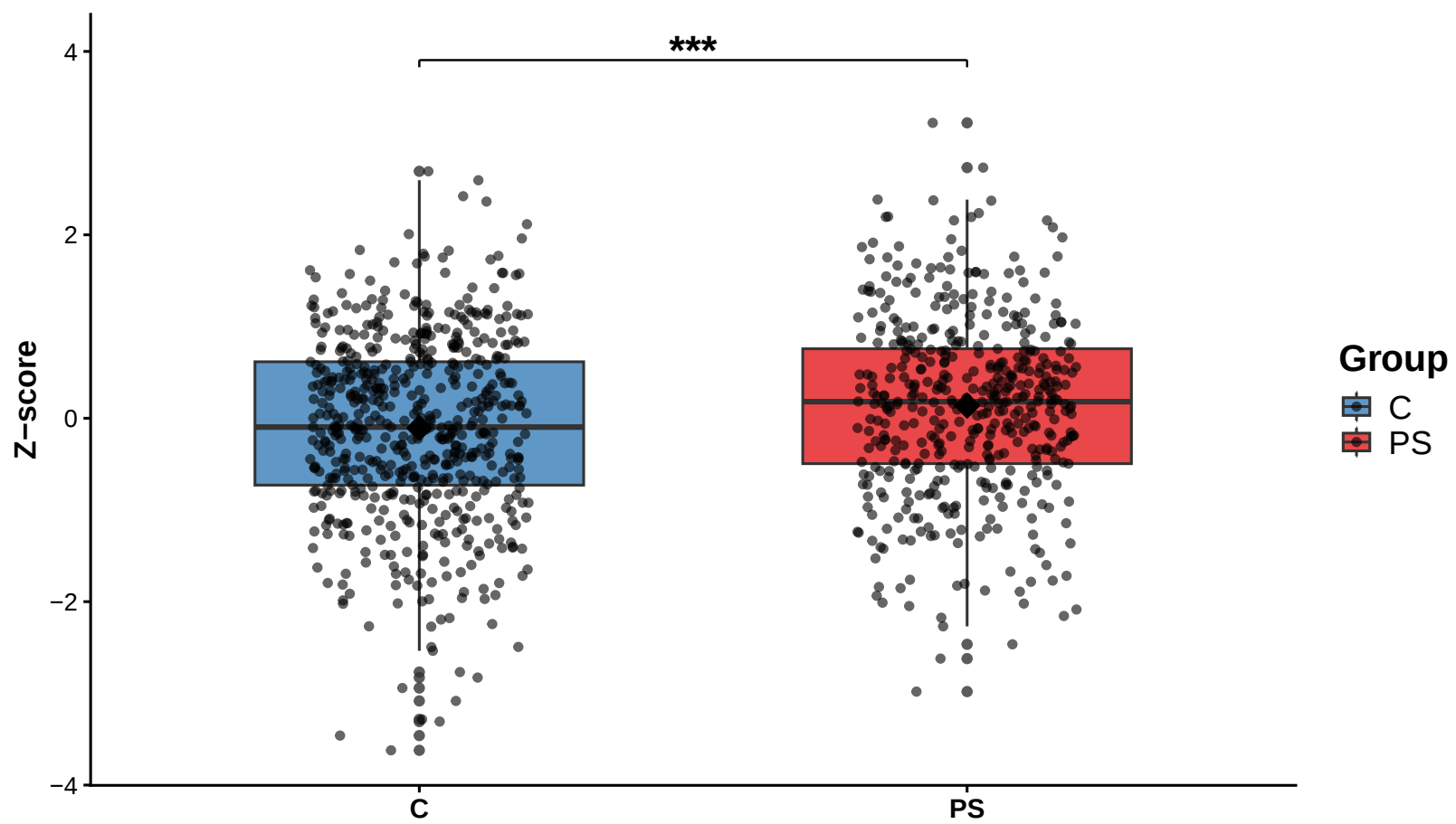
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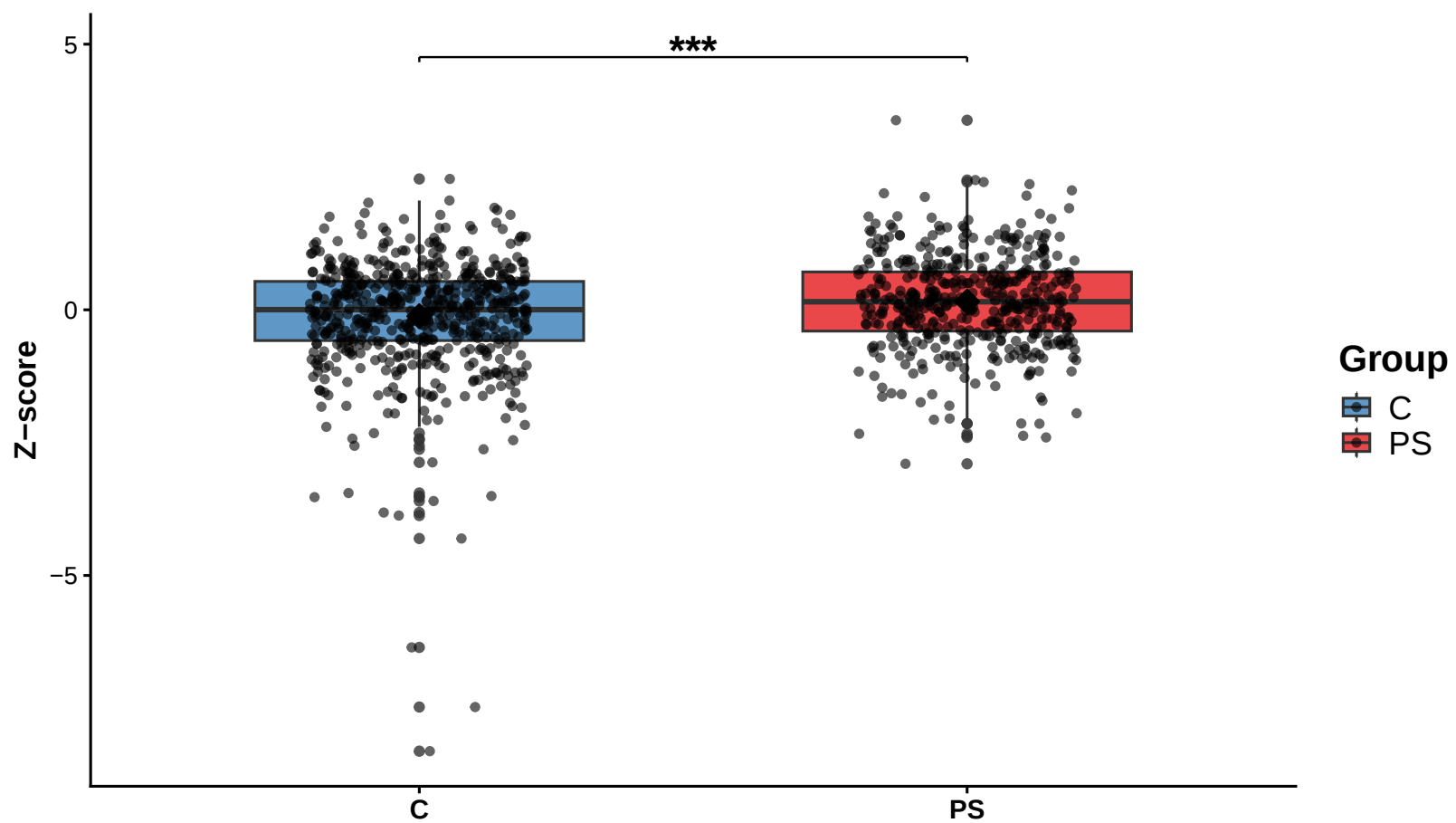
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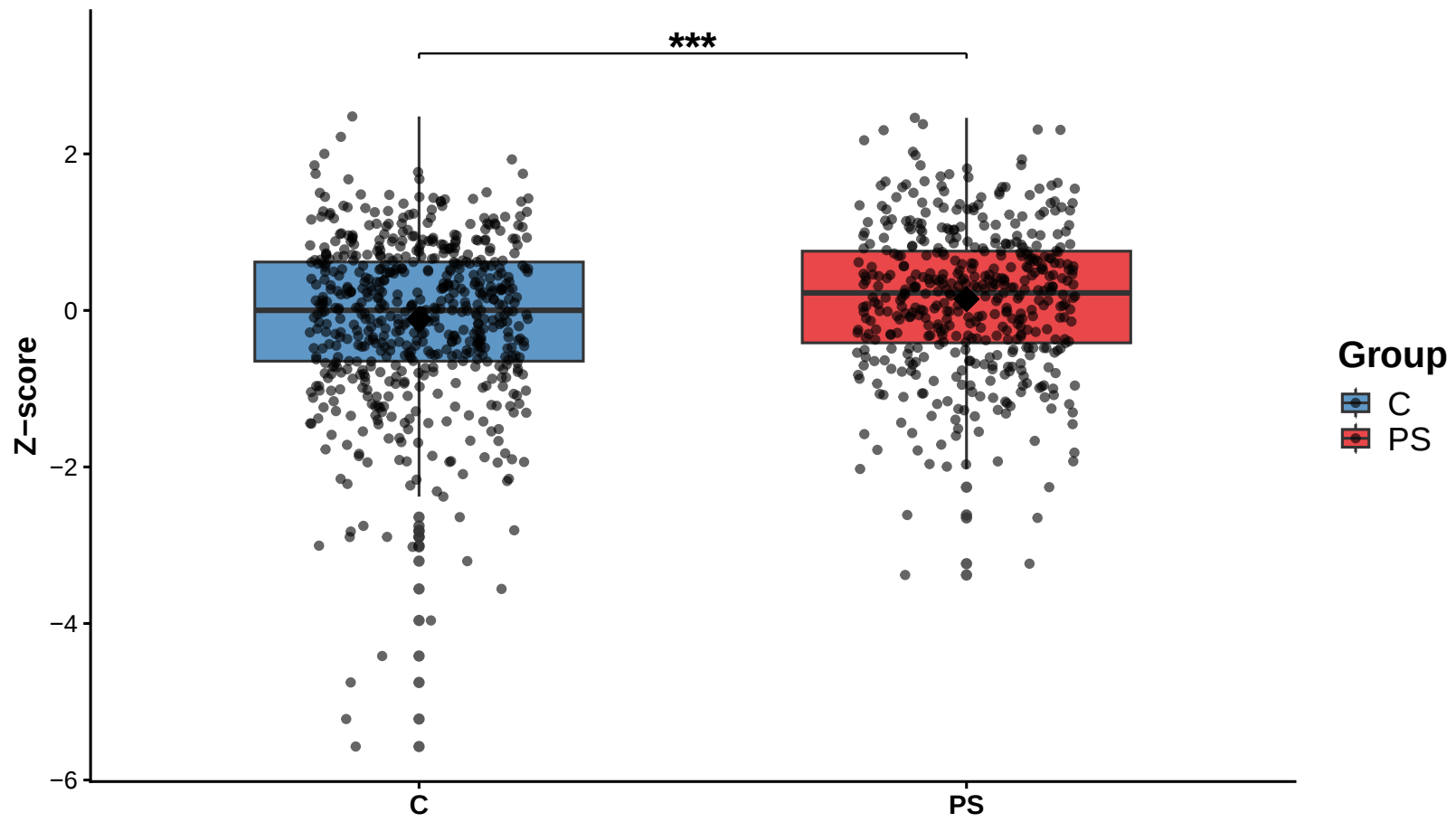
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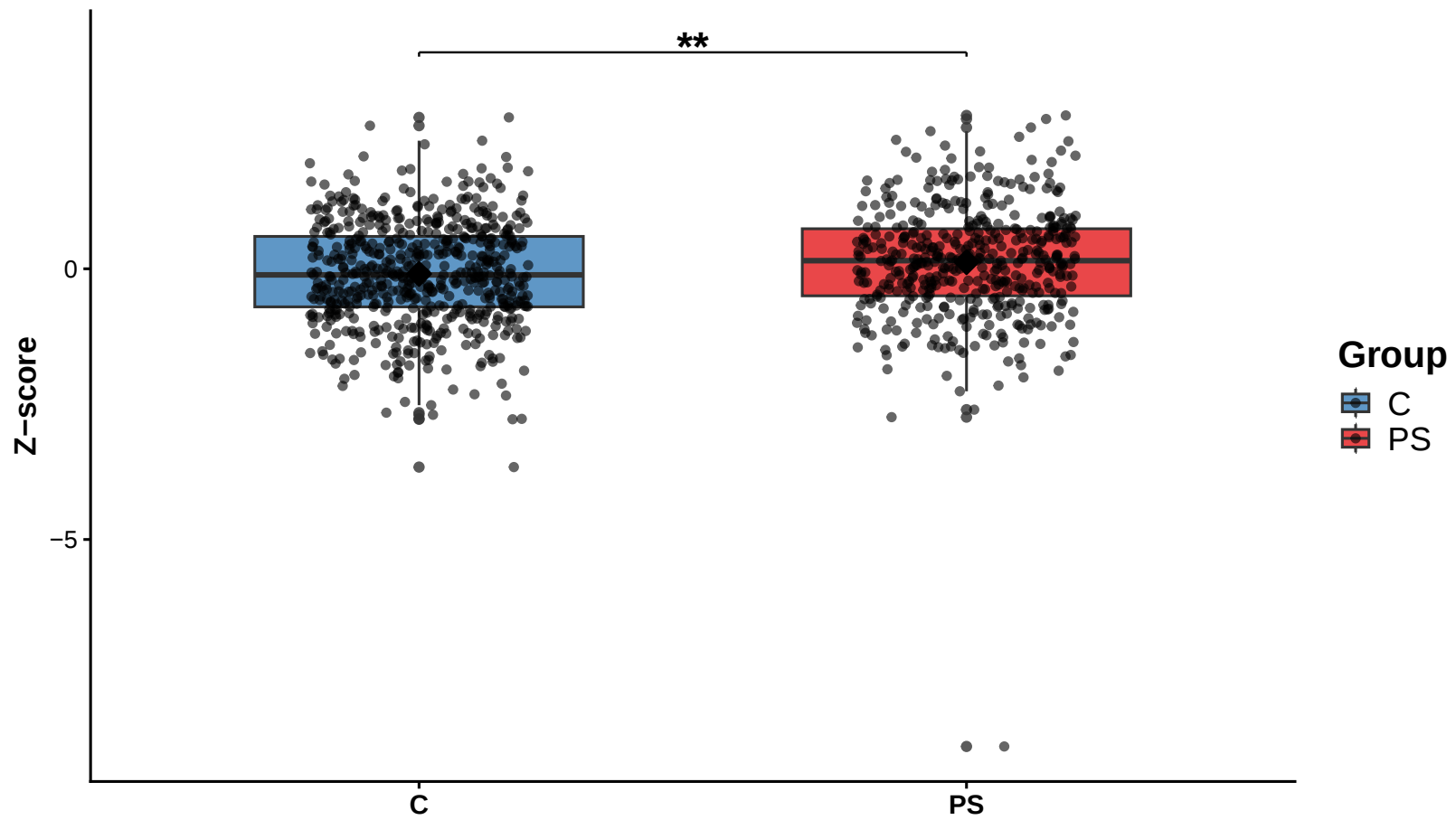
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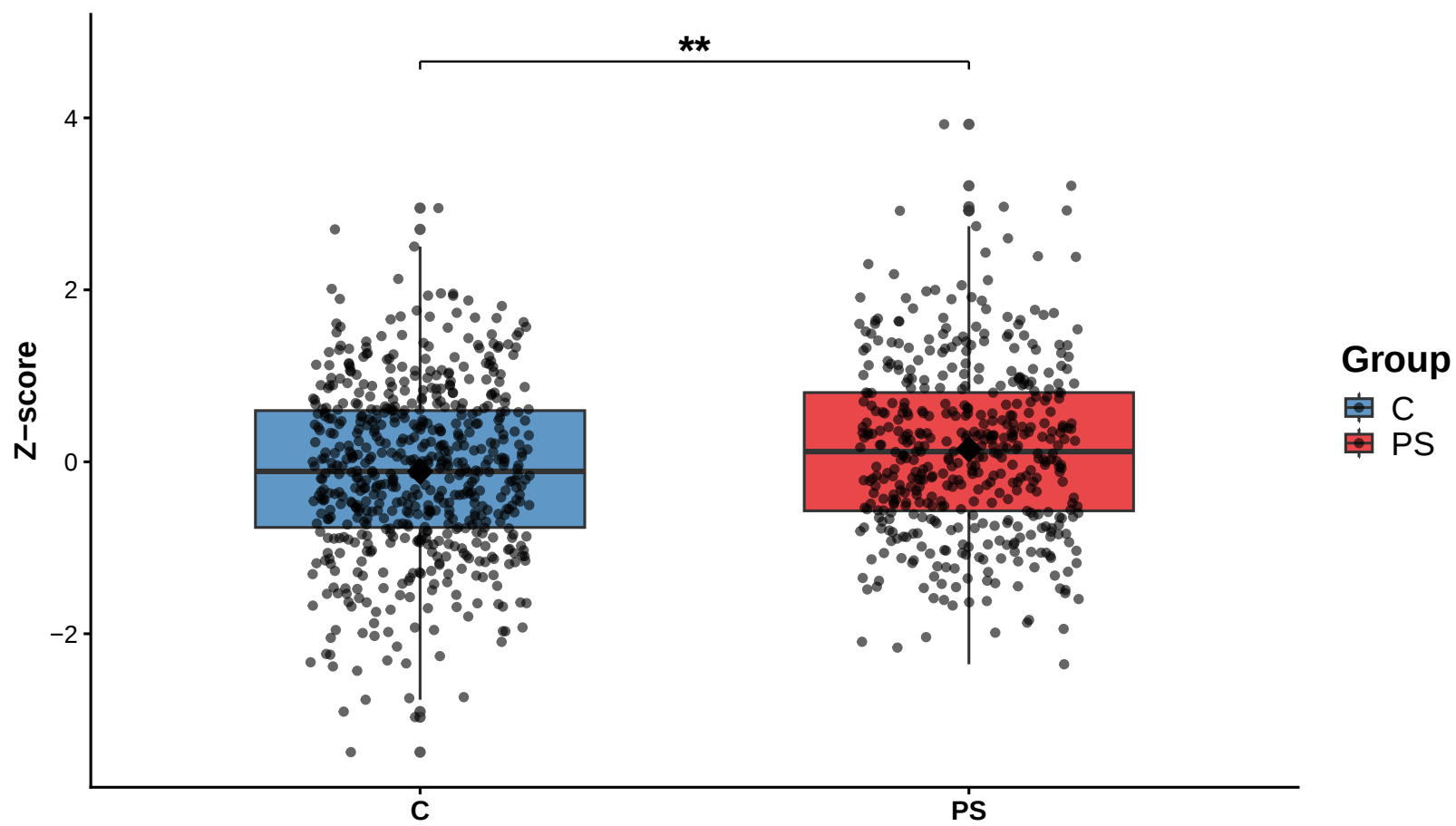
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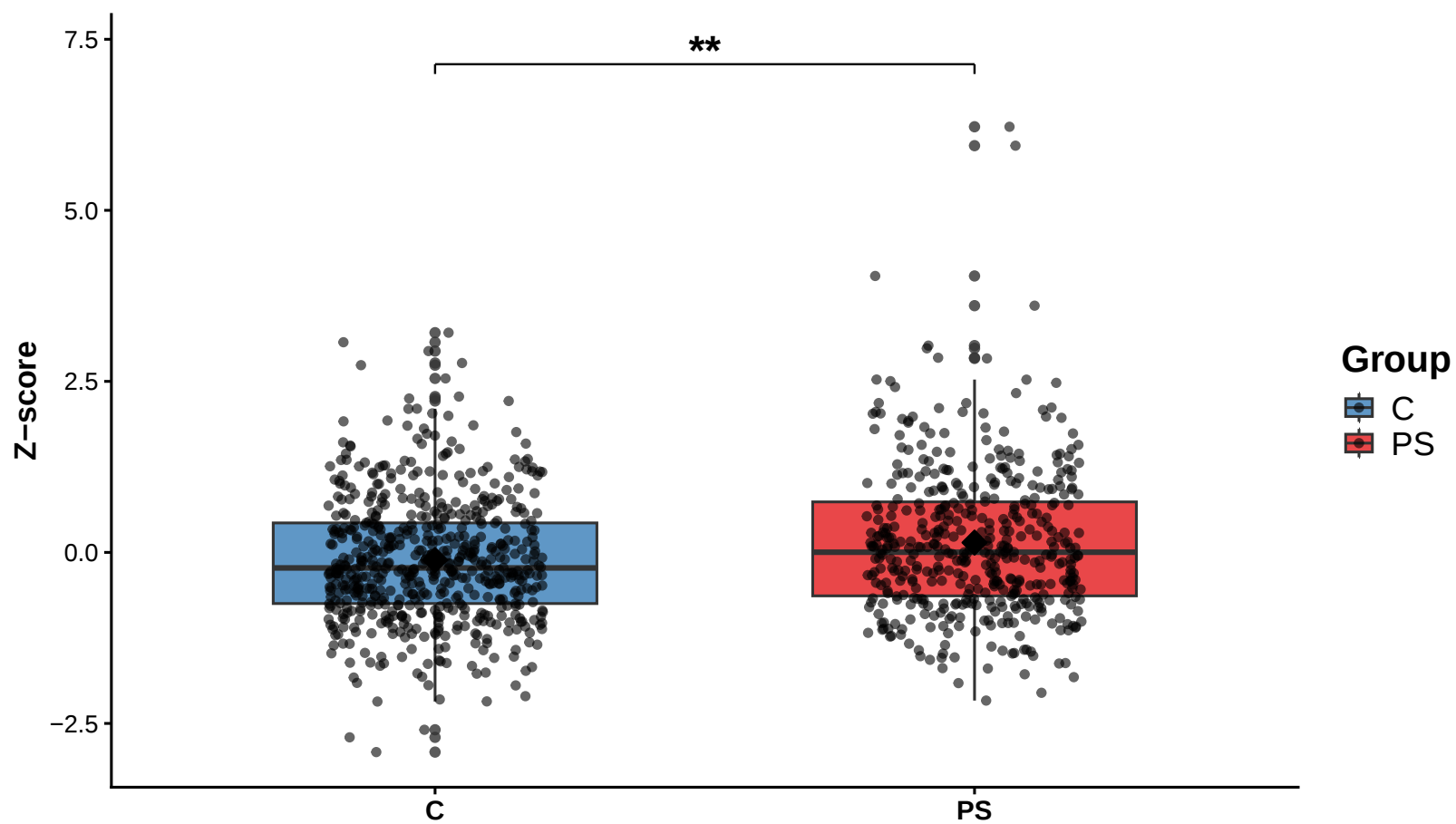
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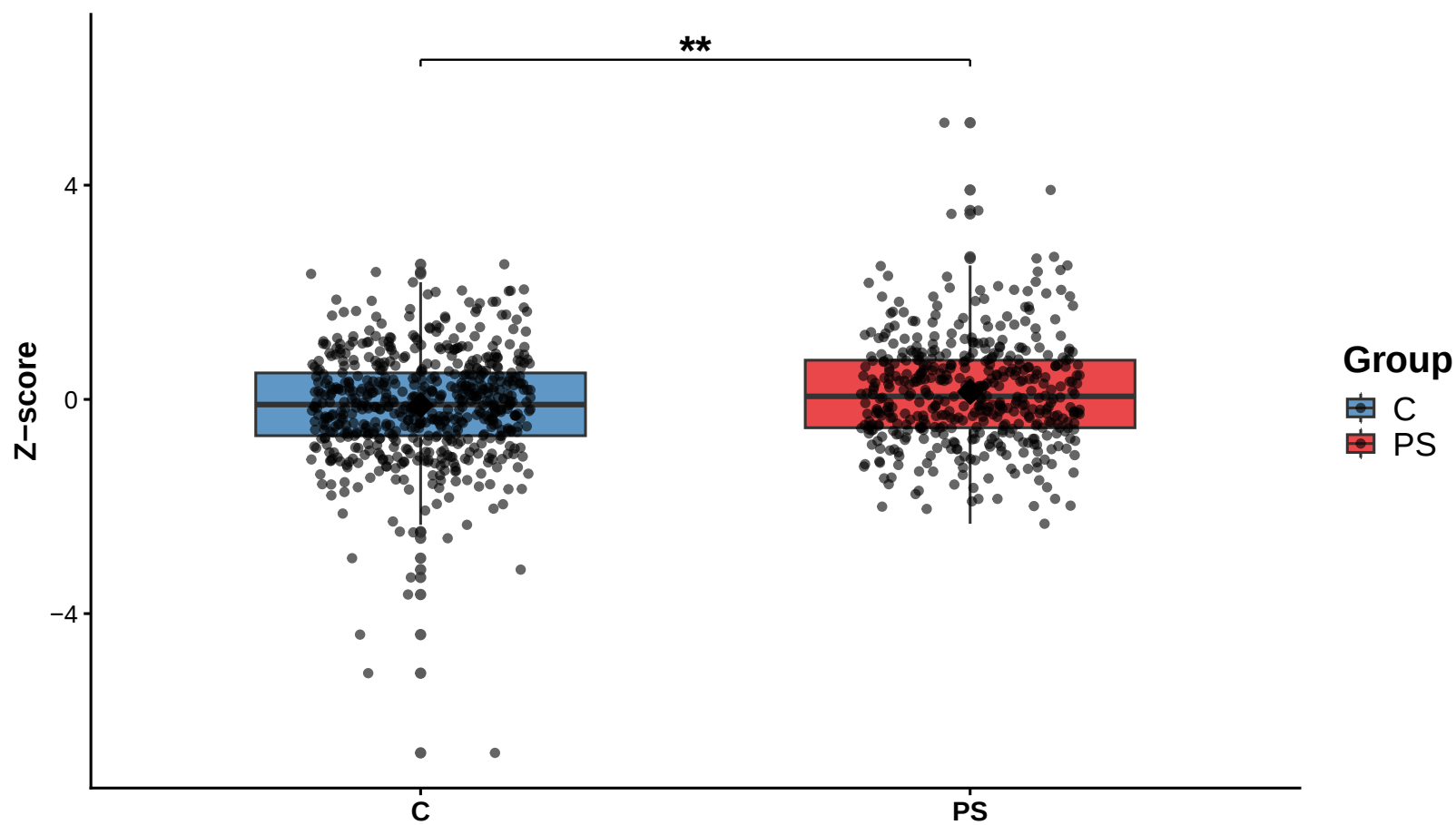
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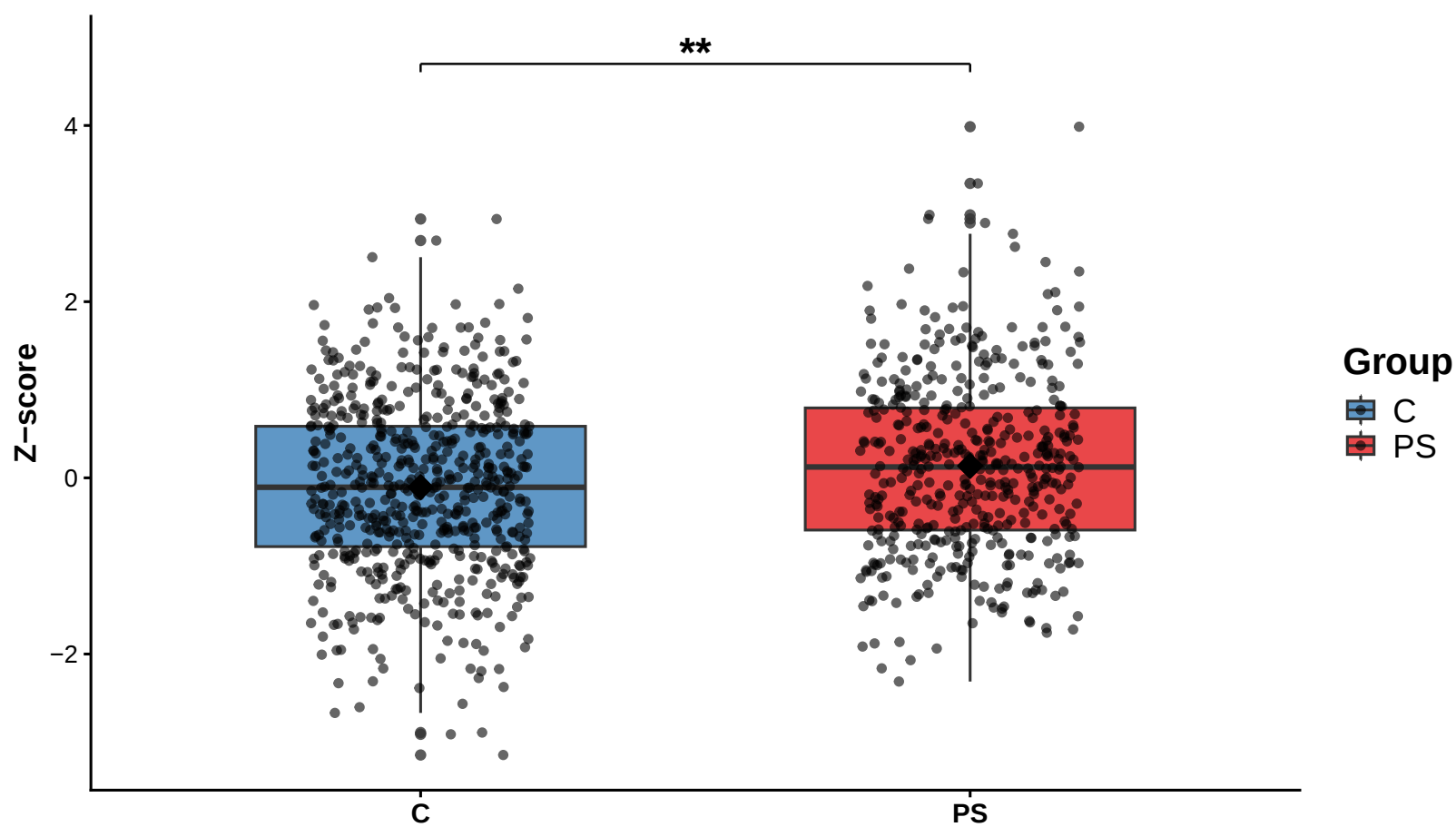
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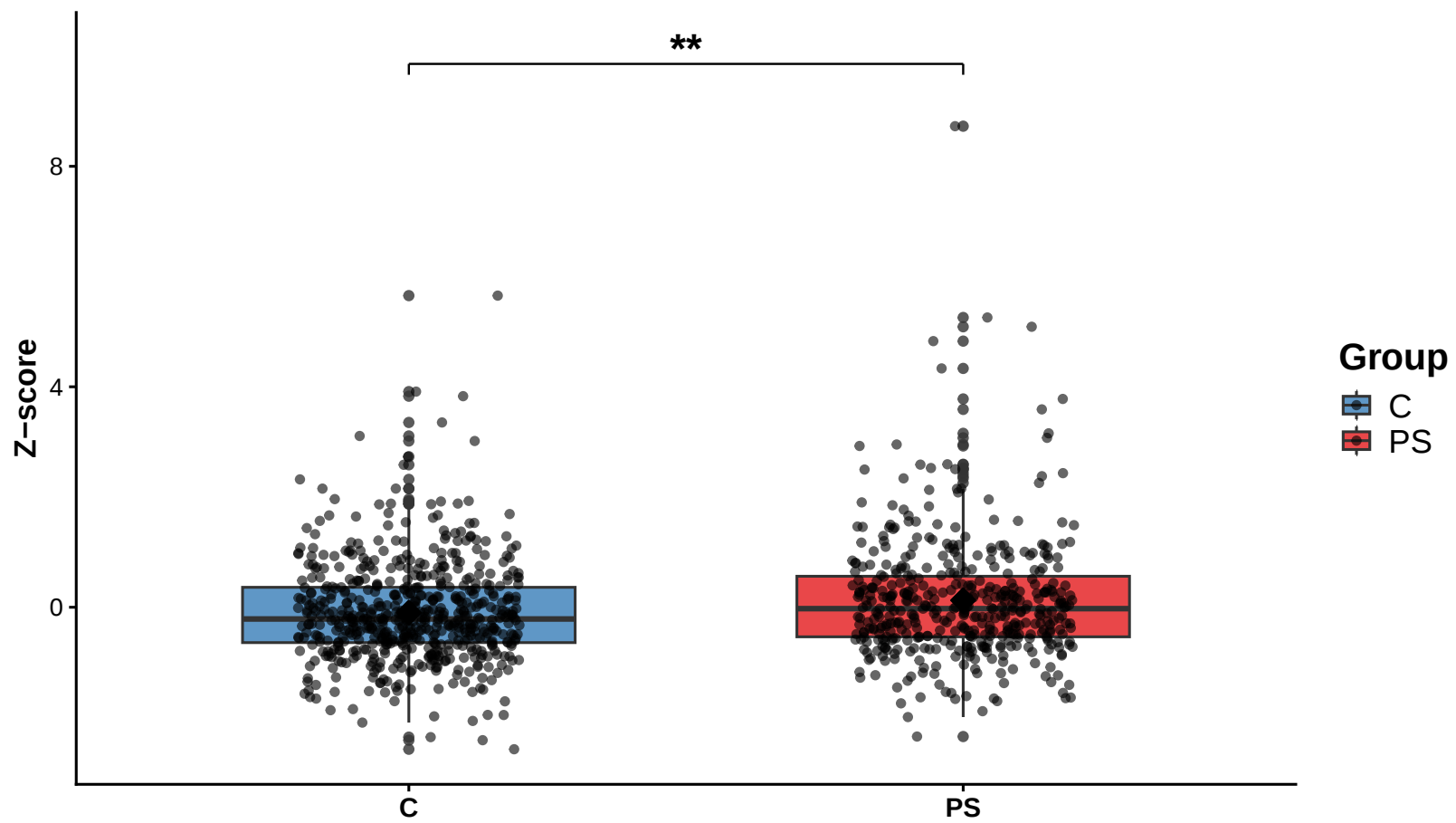
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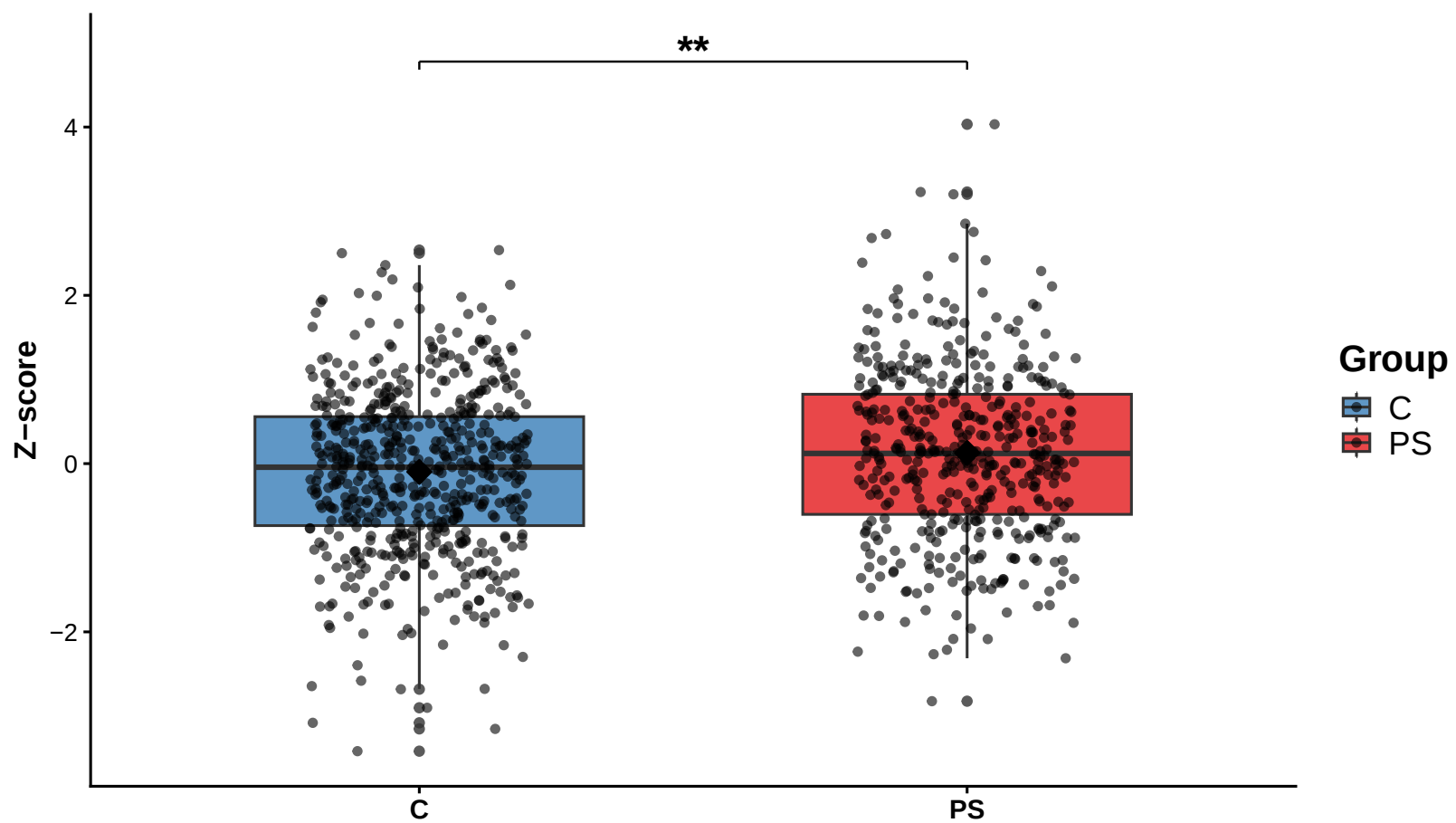
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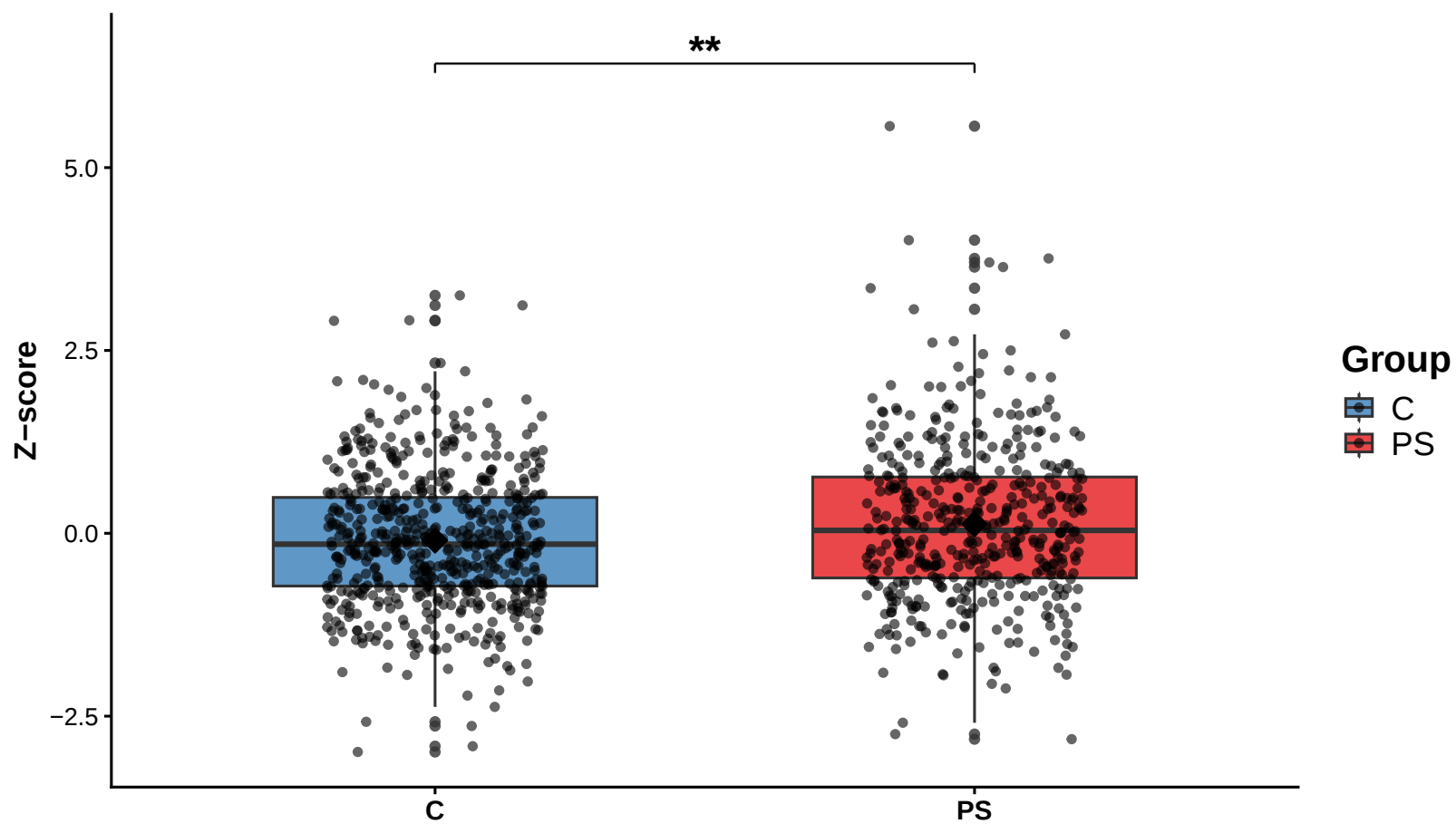
LDL_CE_pct_C



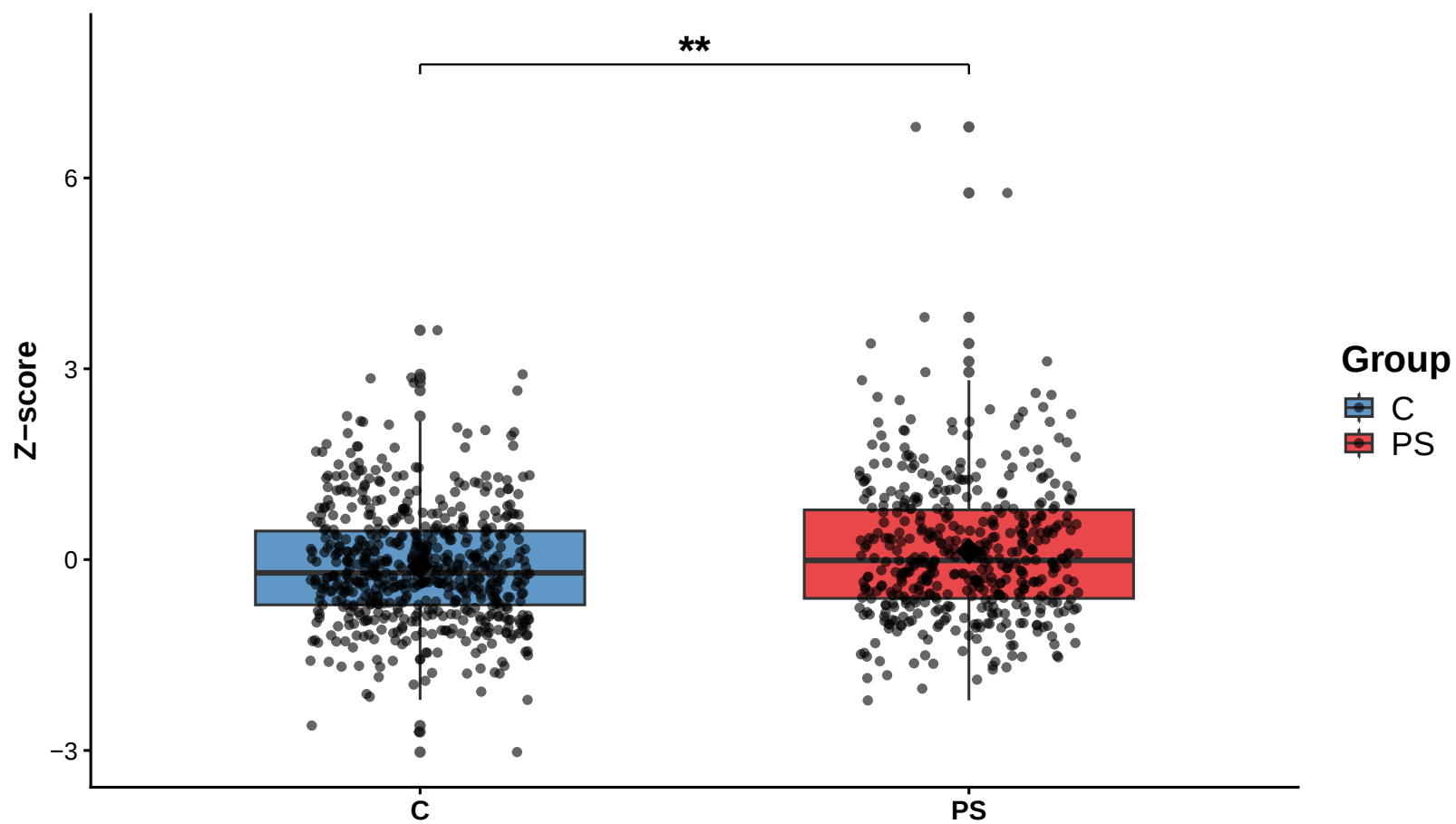
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Omega_3

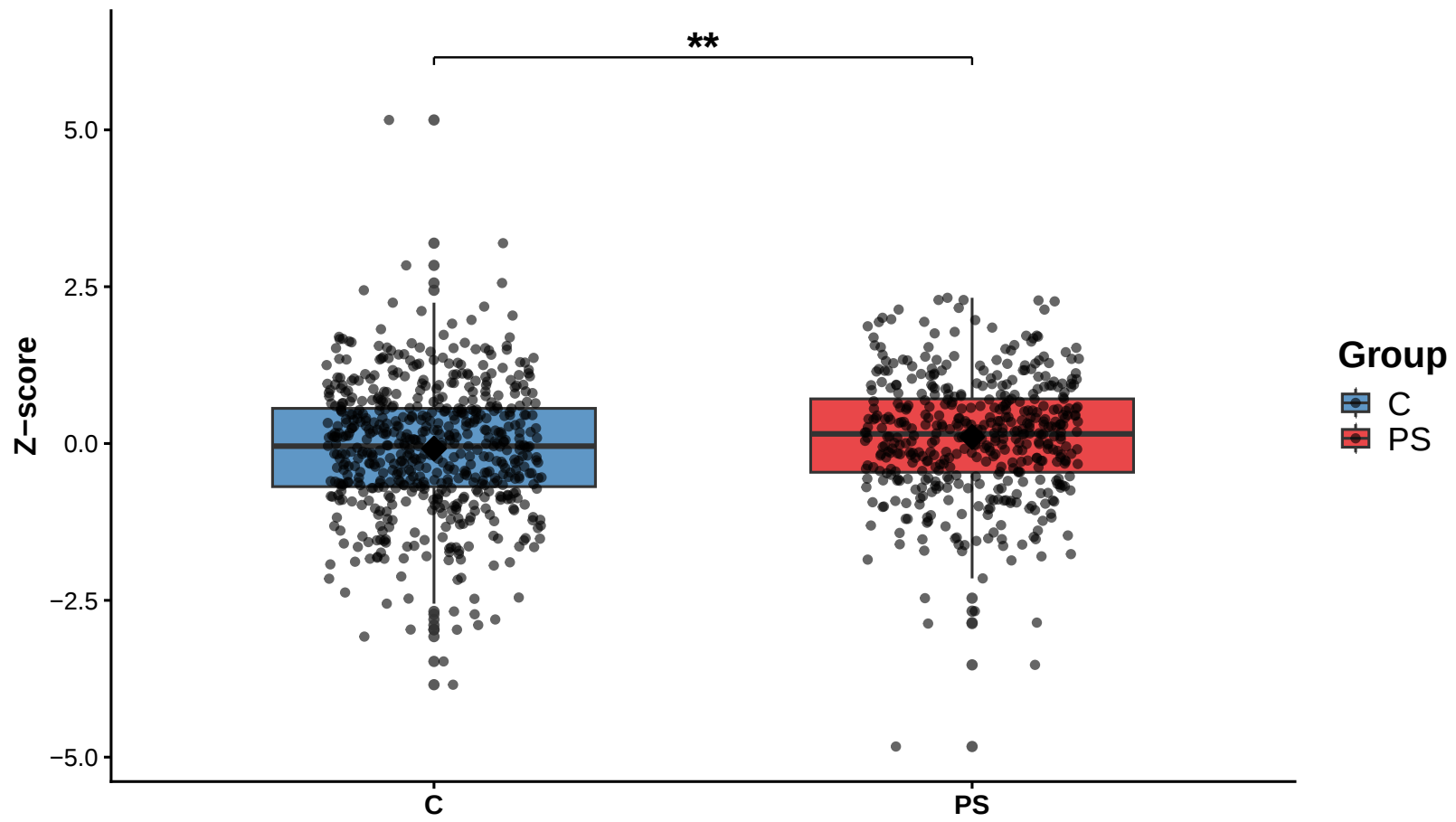


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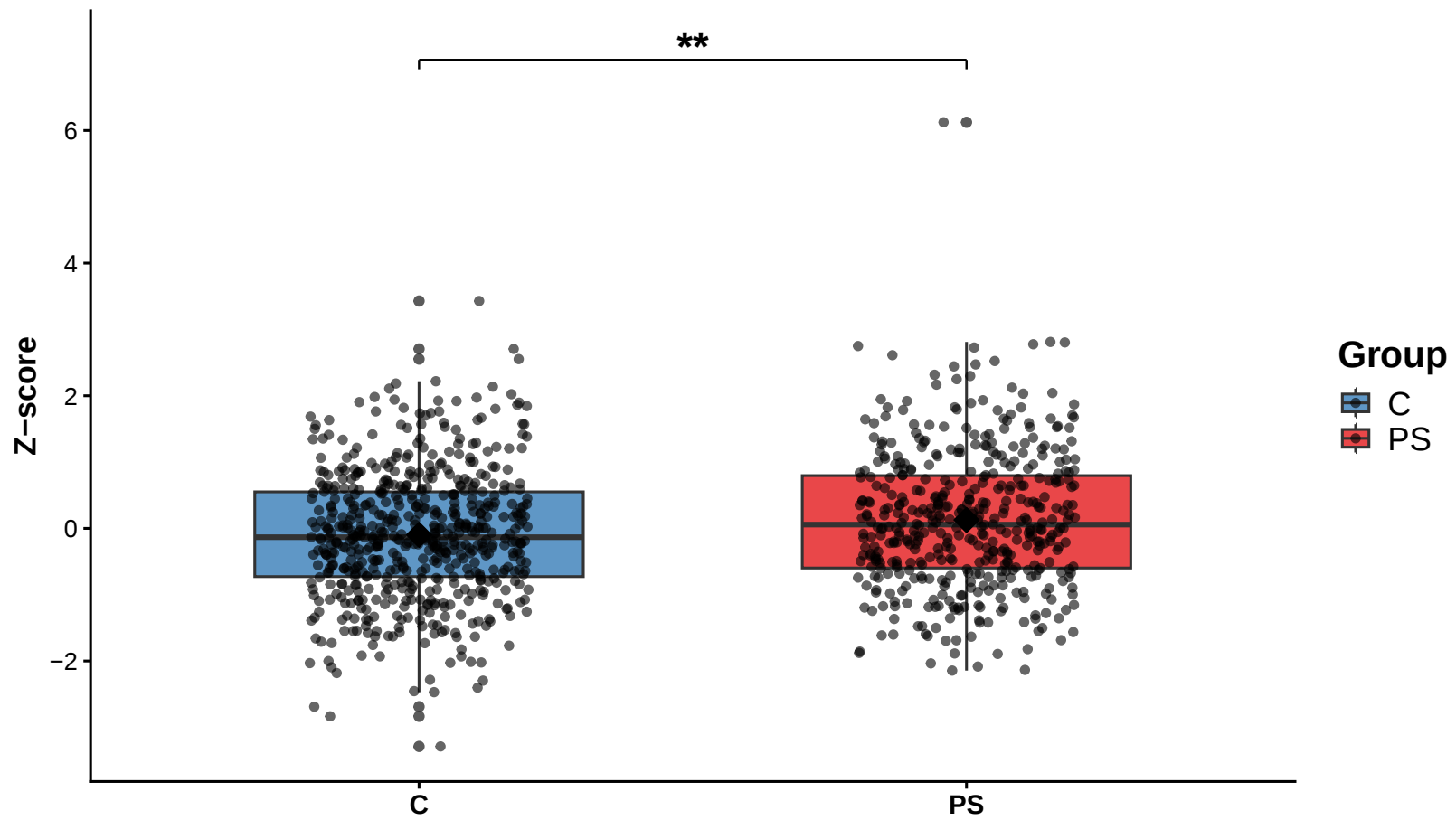
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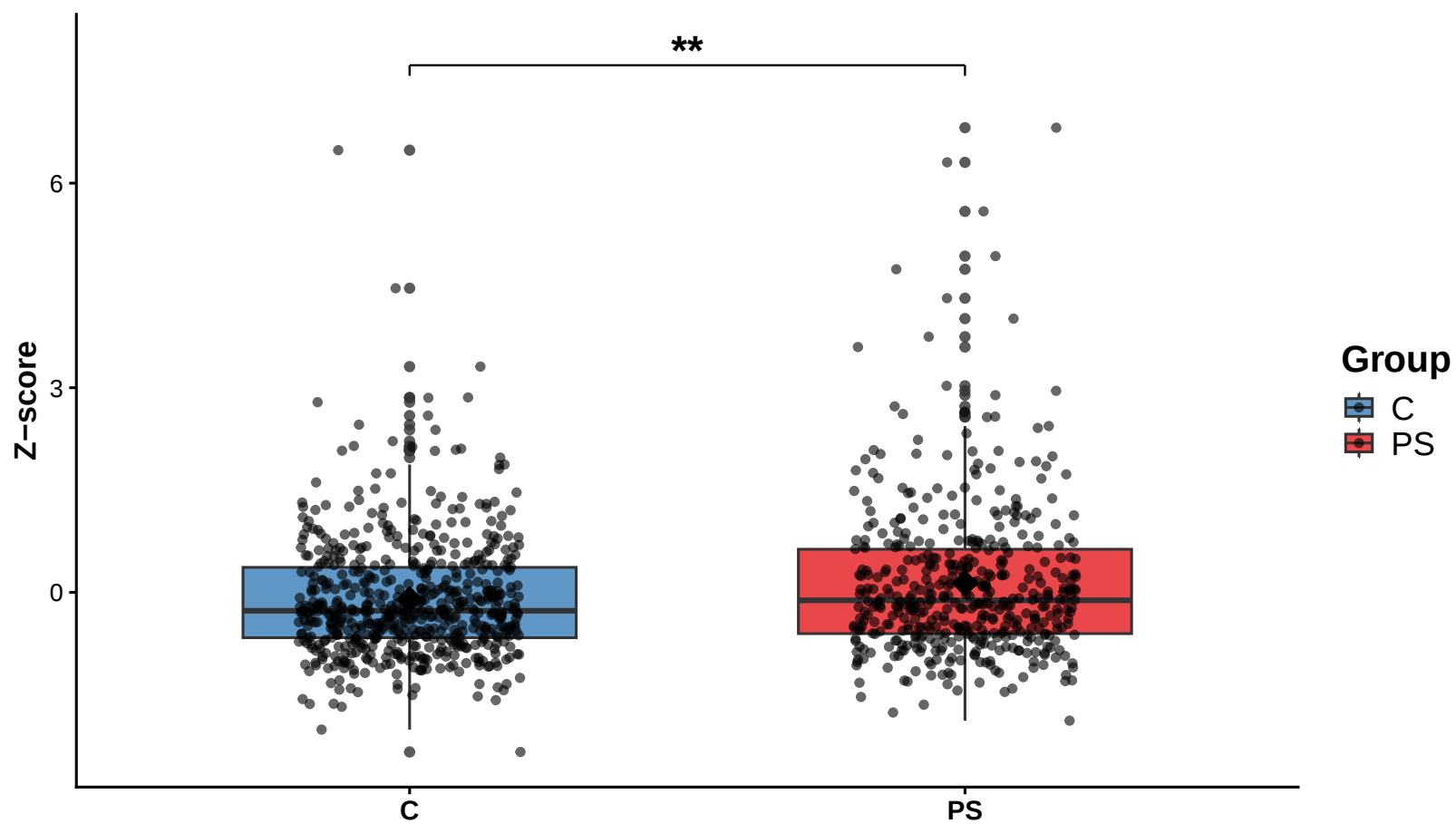


XS_VLDL_P

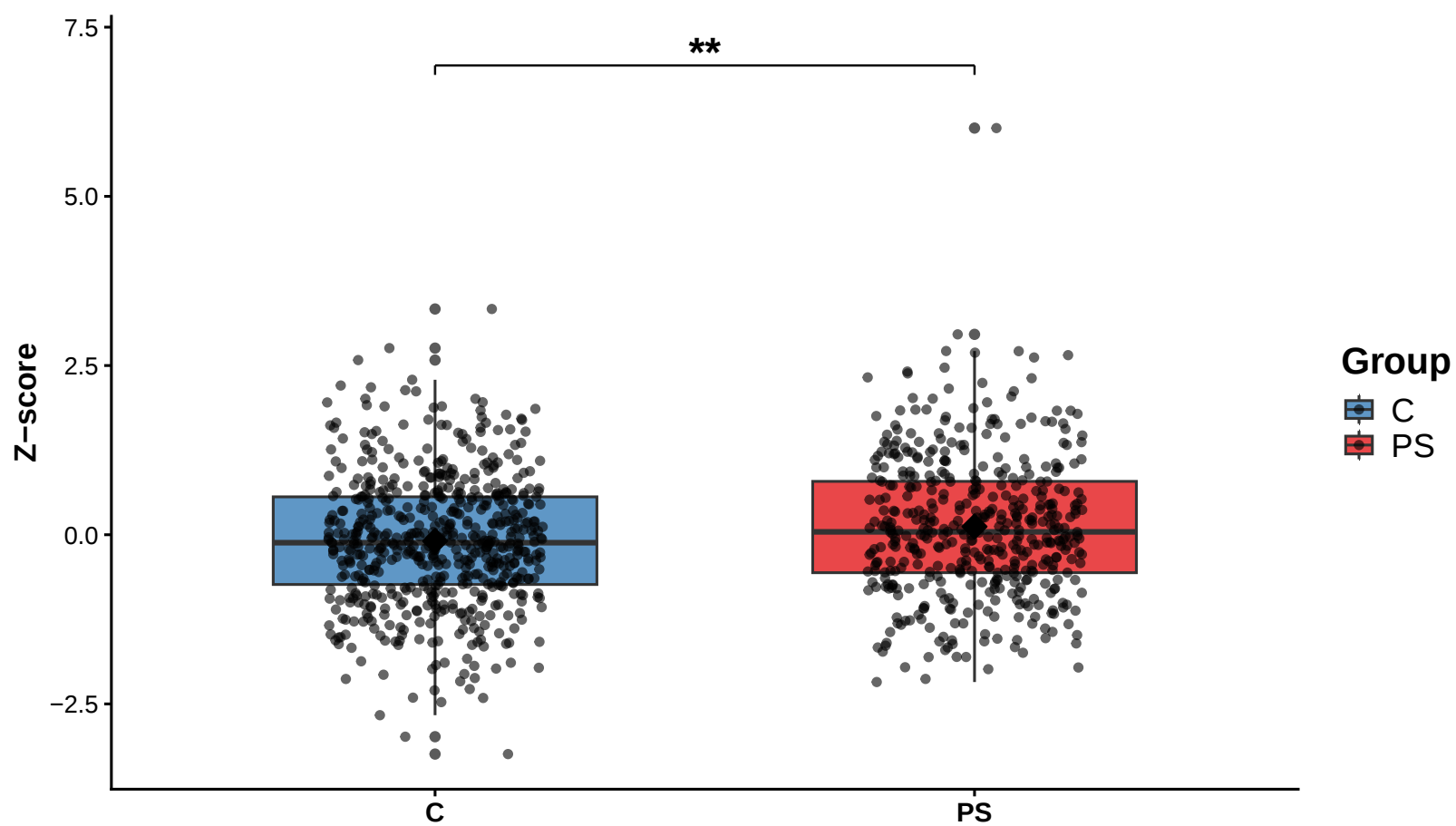
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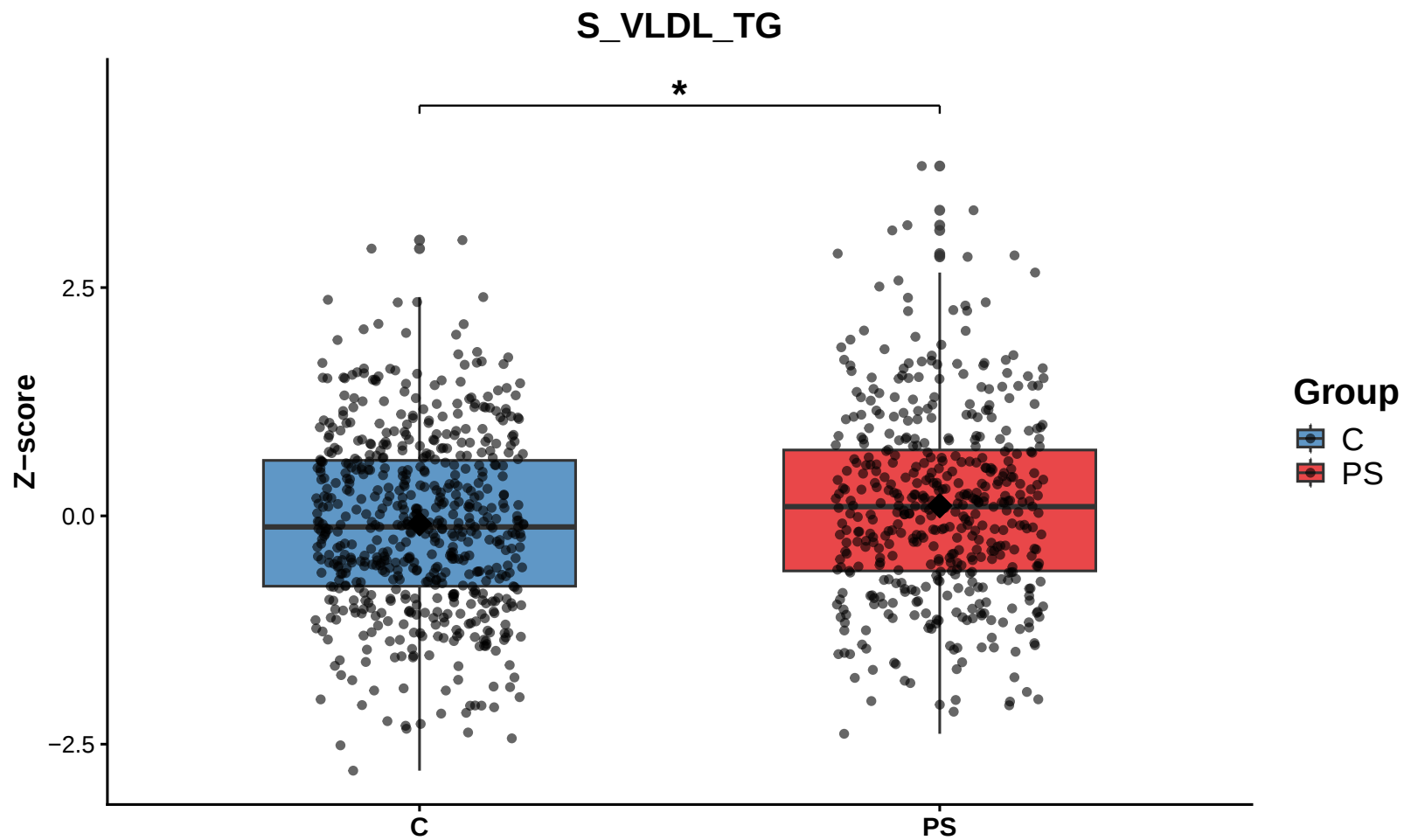
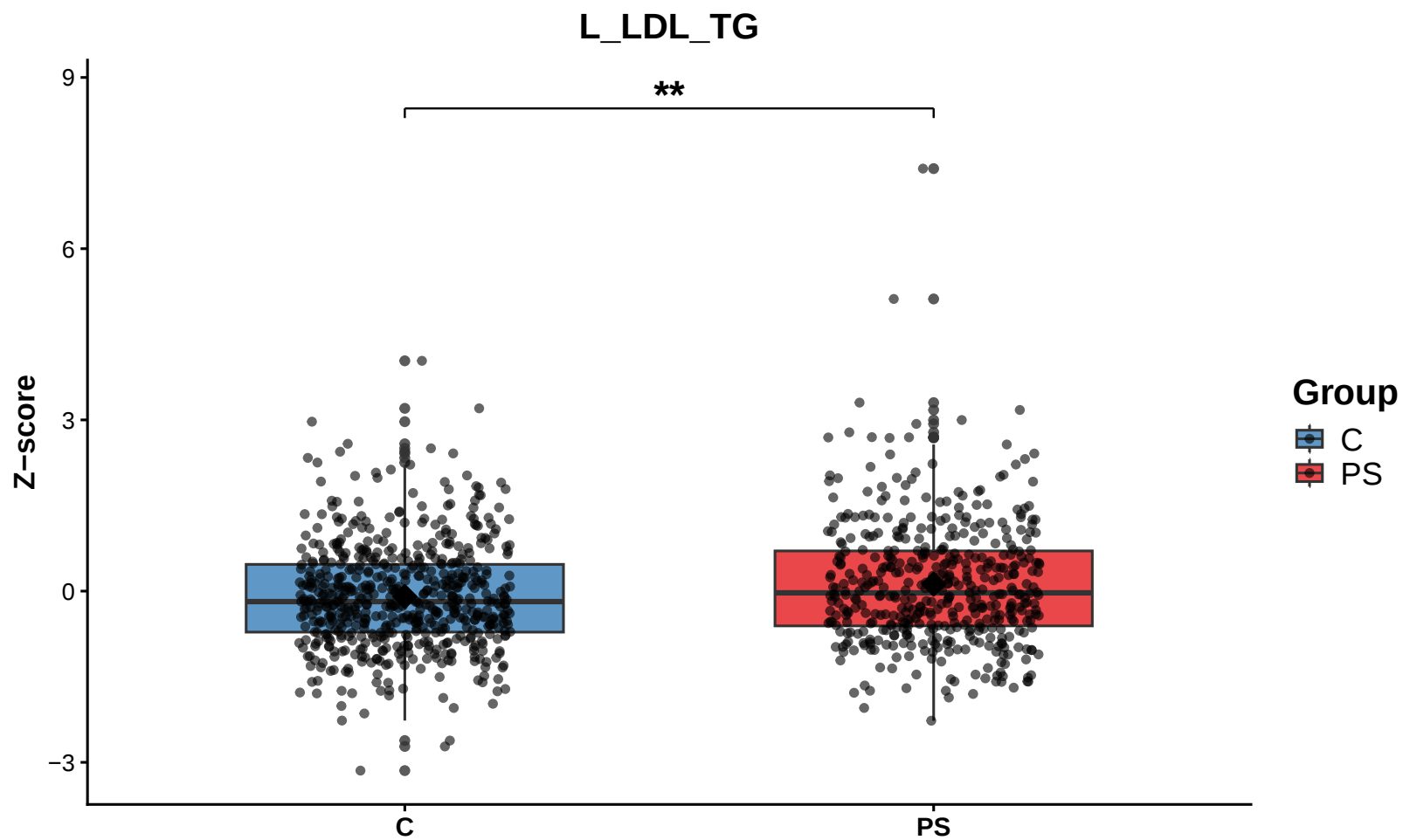


S_LDL_CE_pct_C



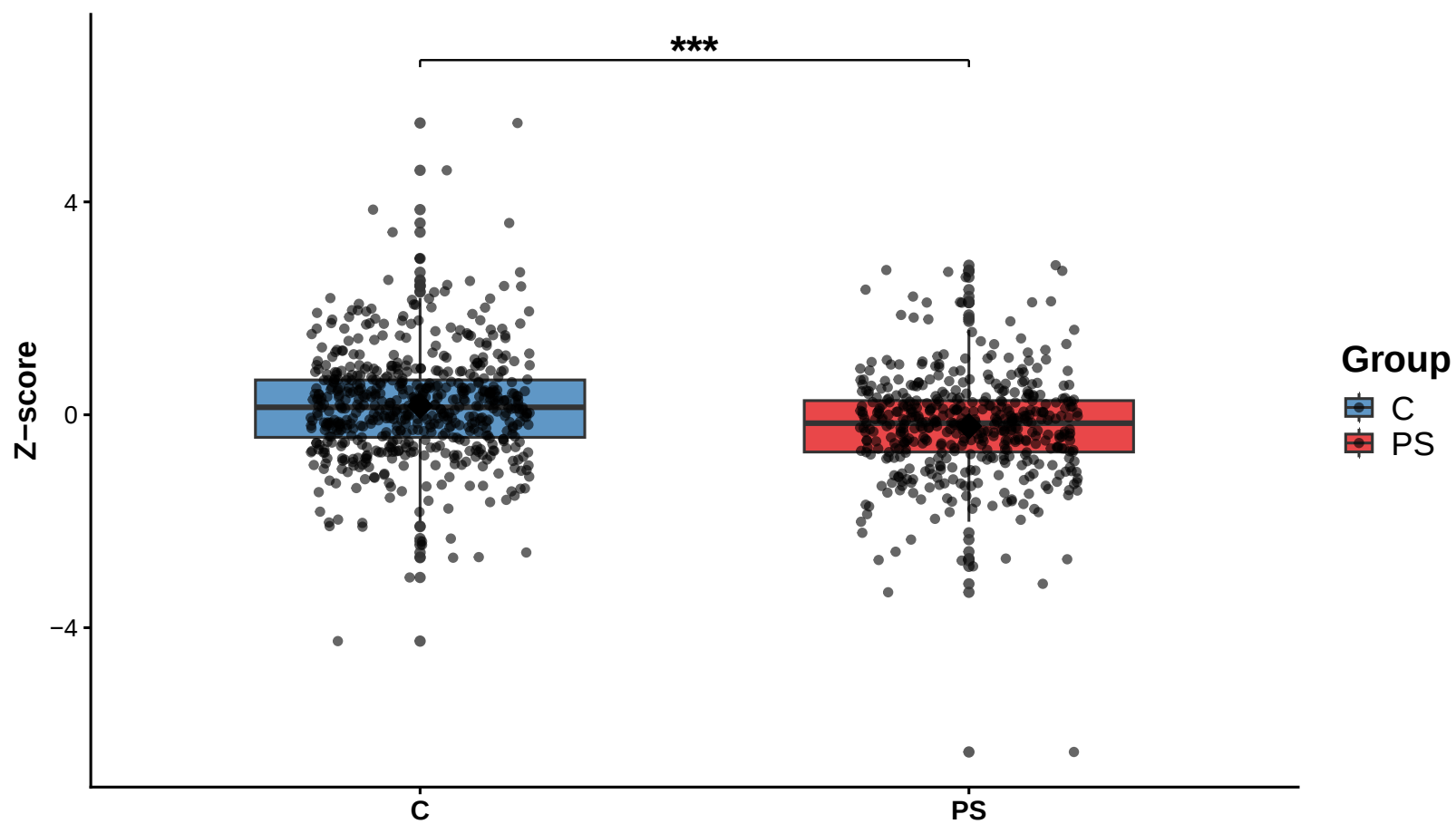
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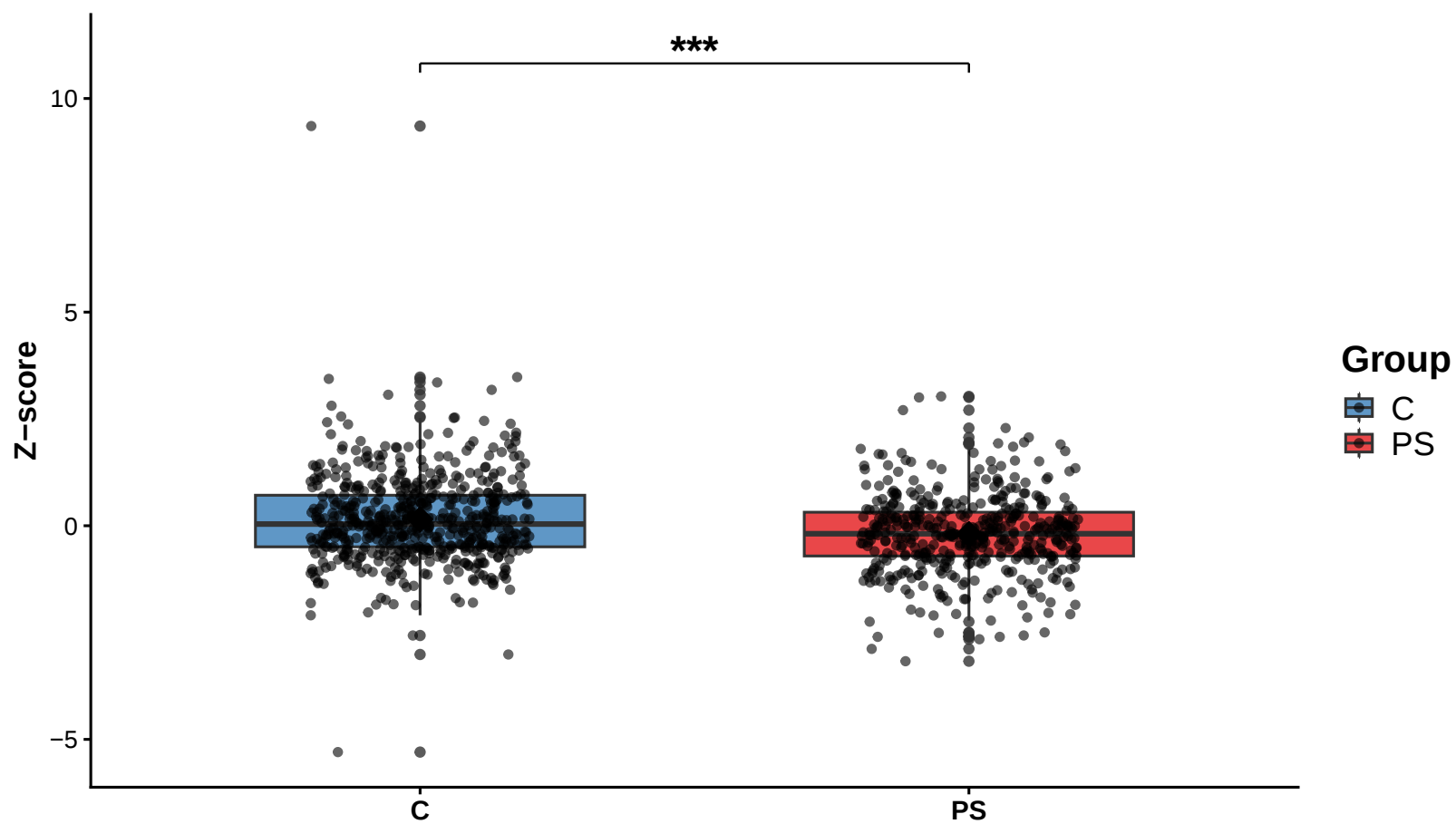


Downregulated biomarkers

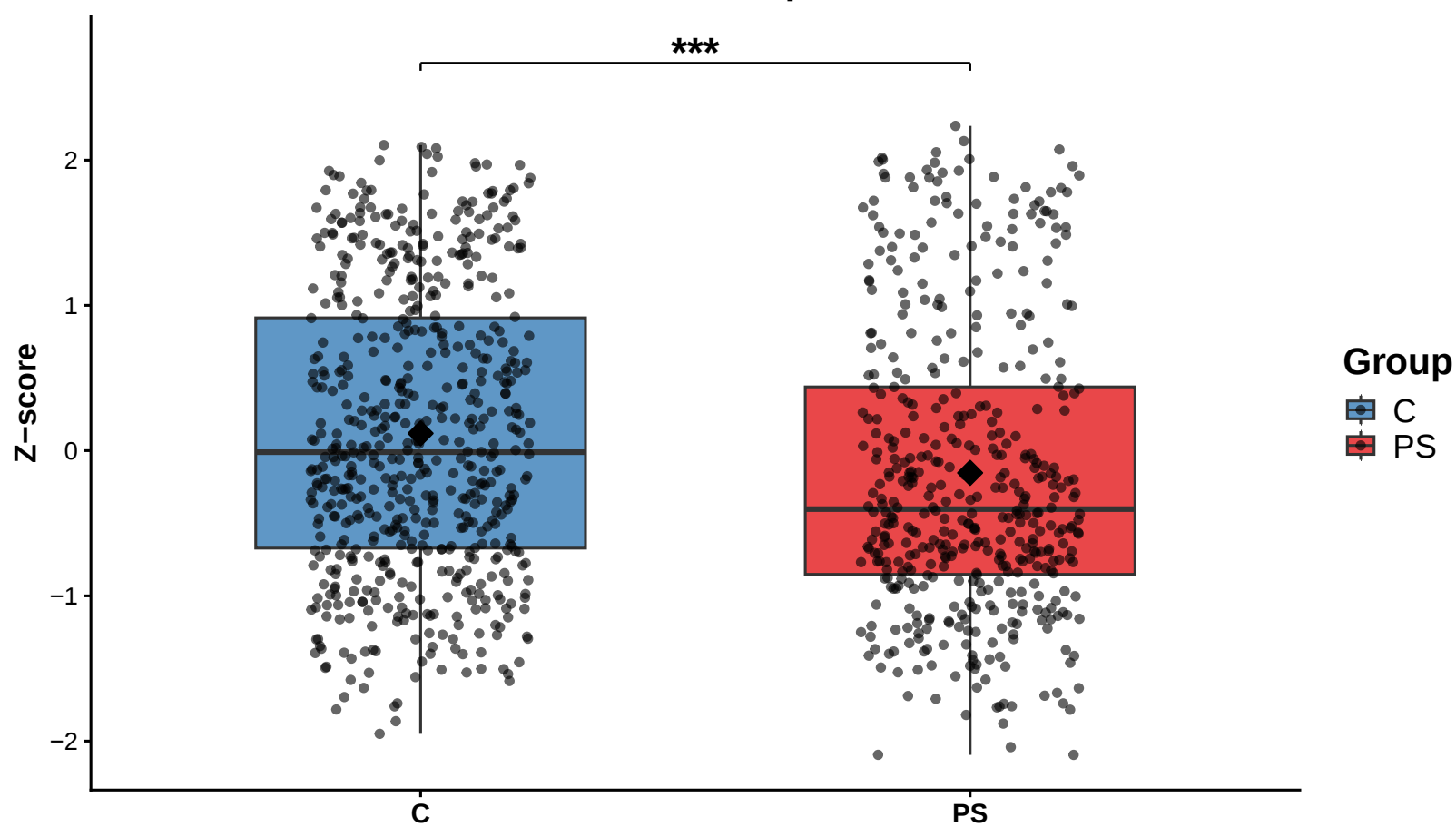
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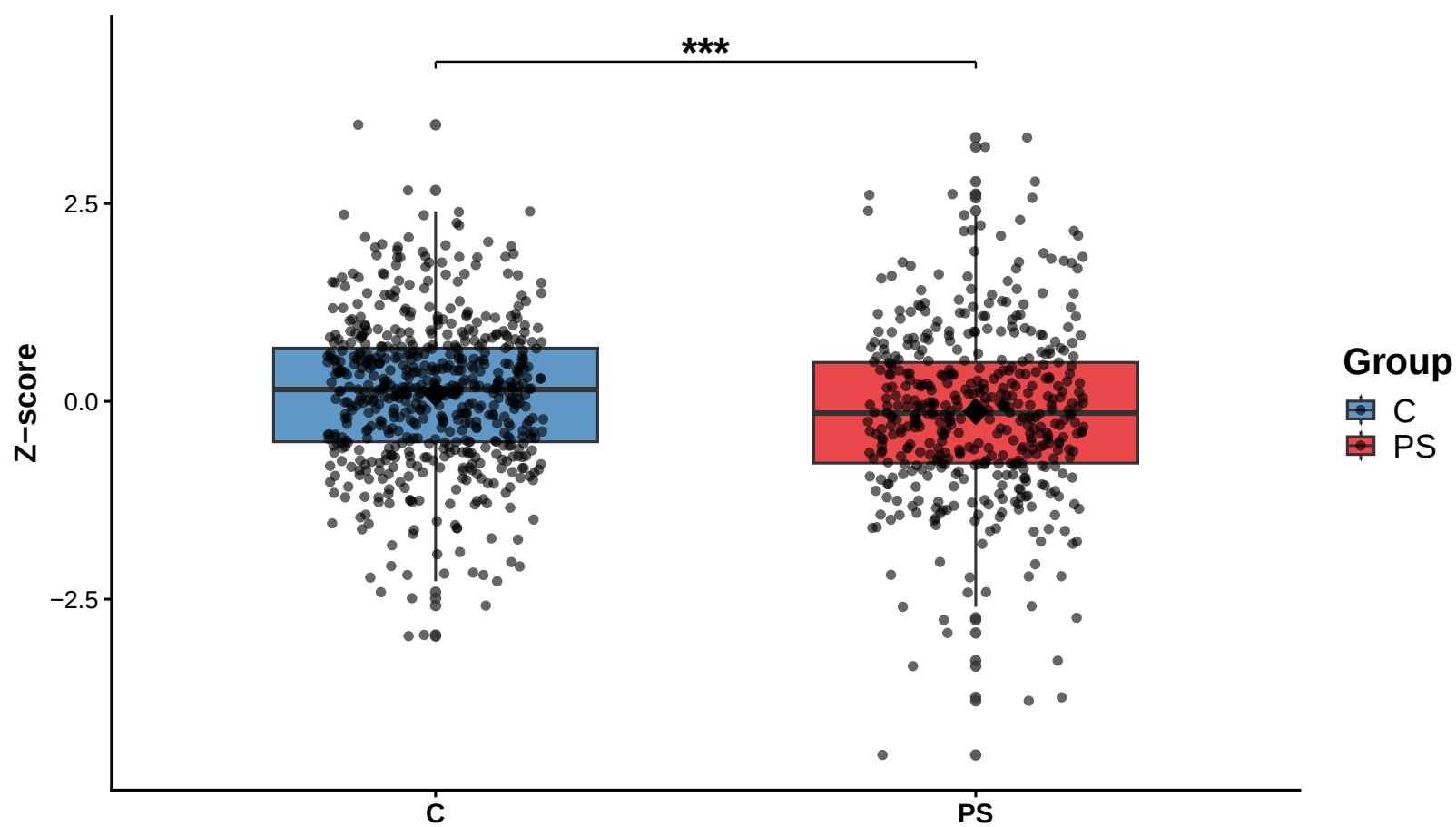
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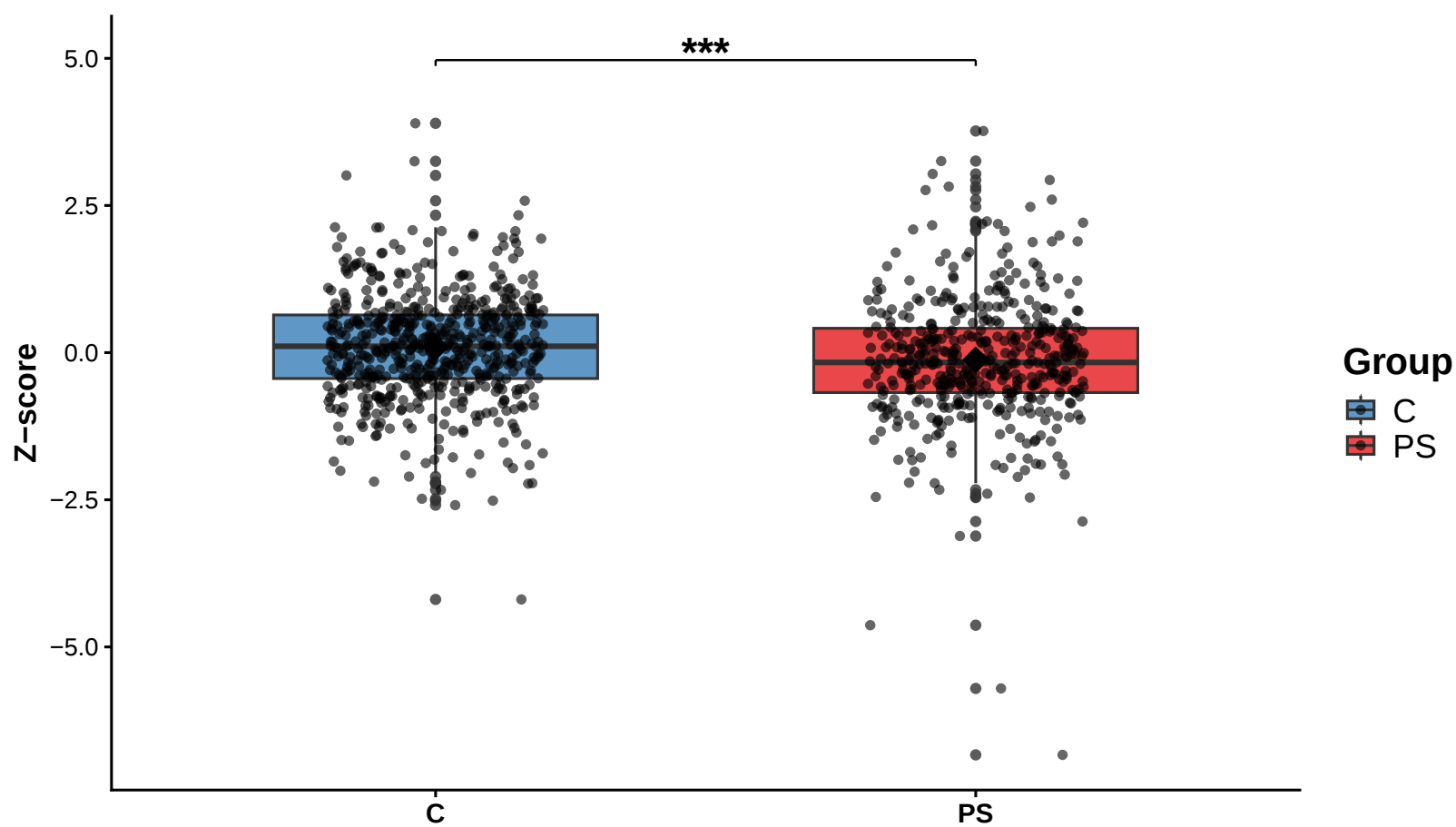
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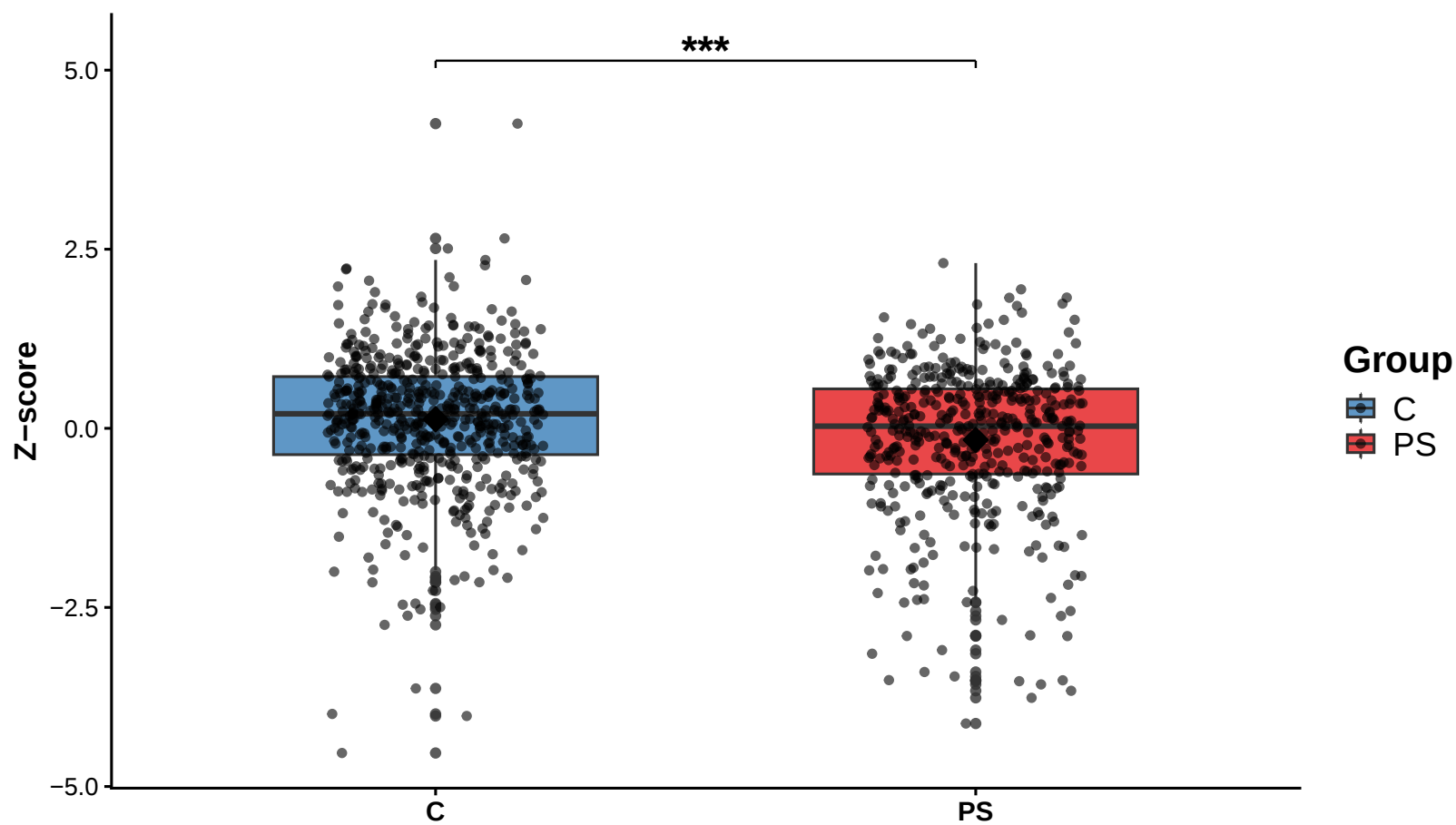
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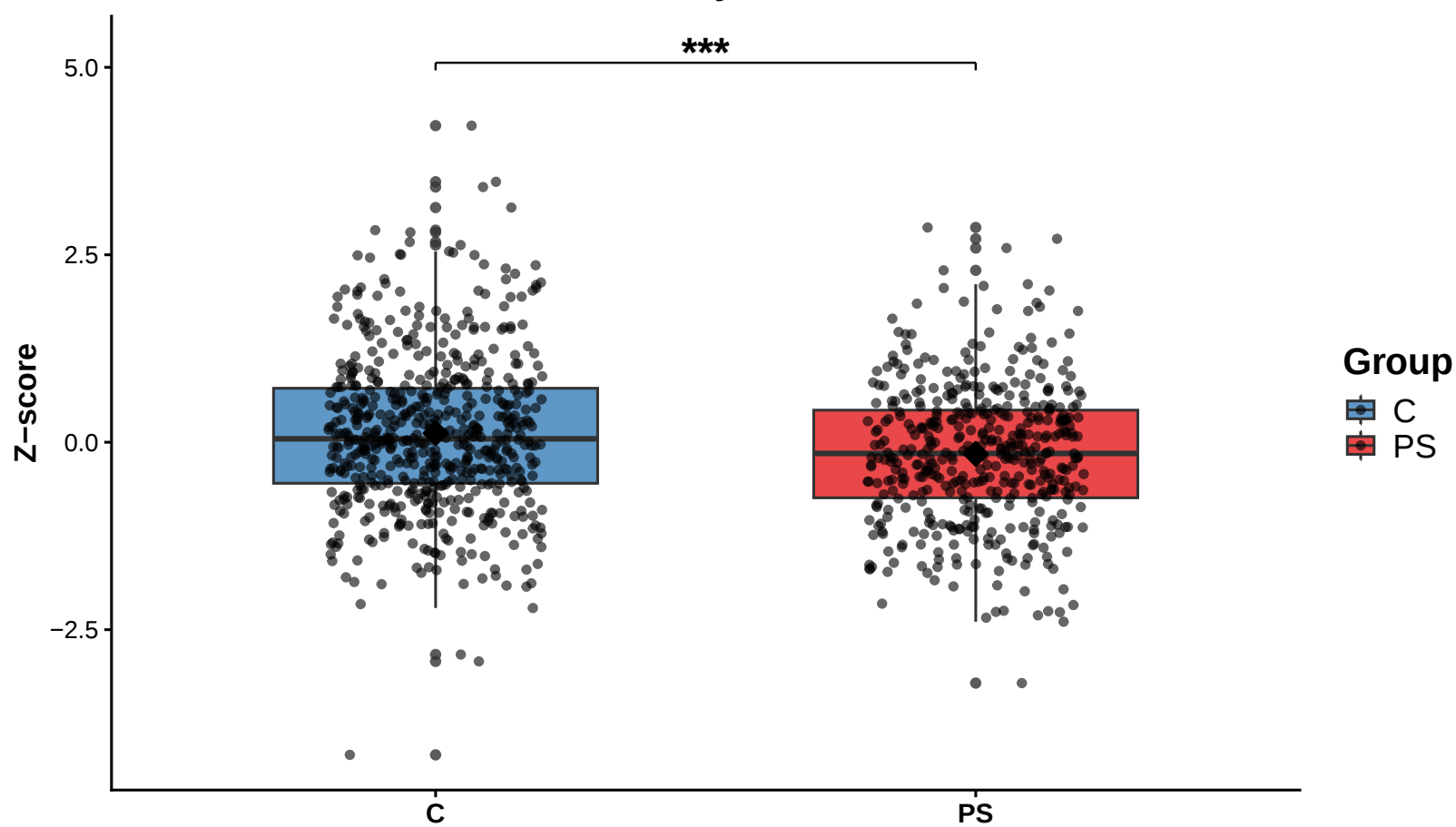
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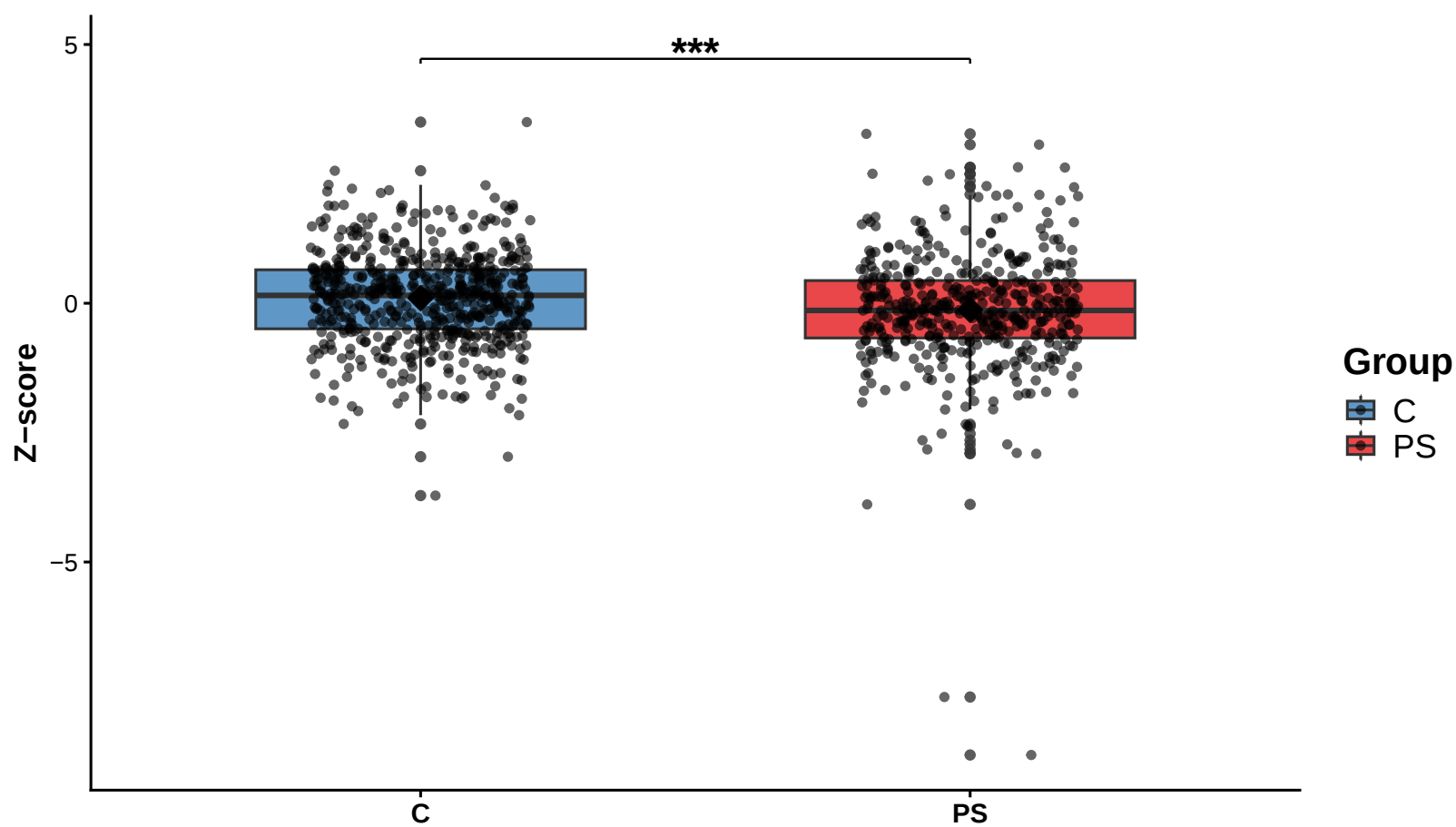
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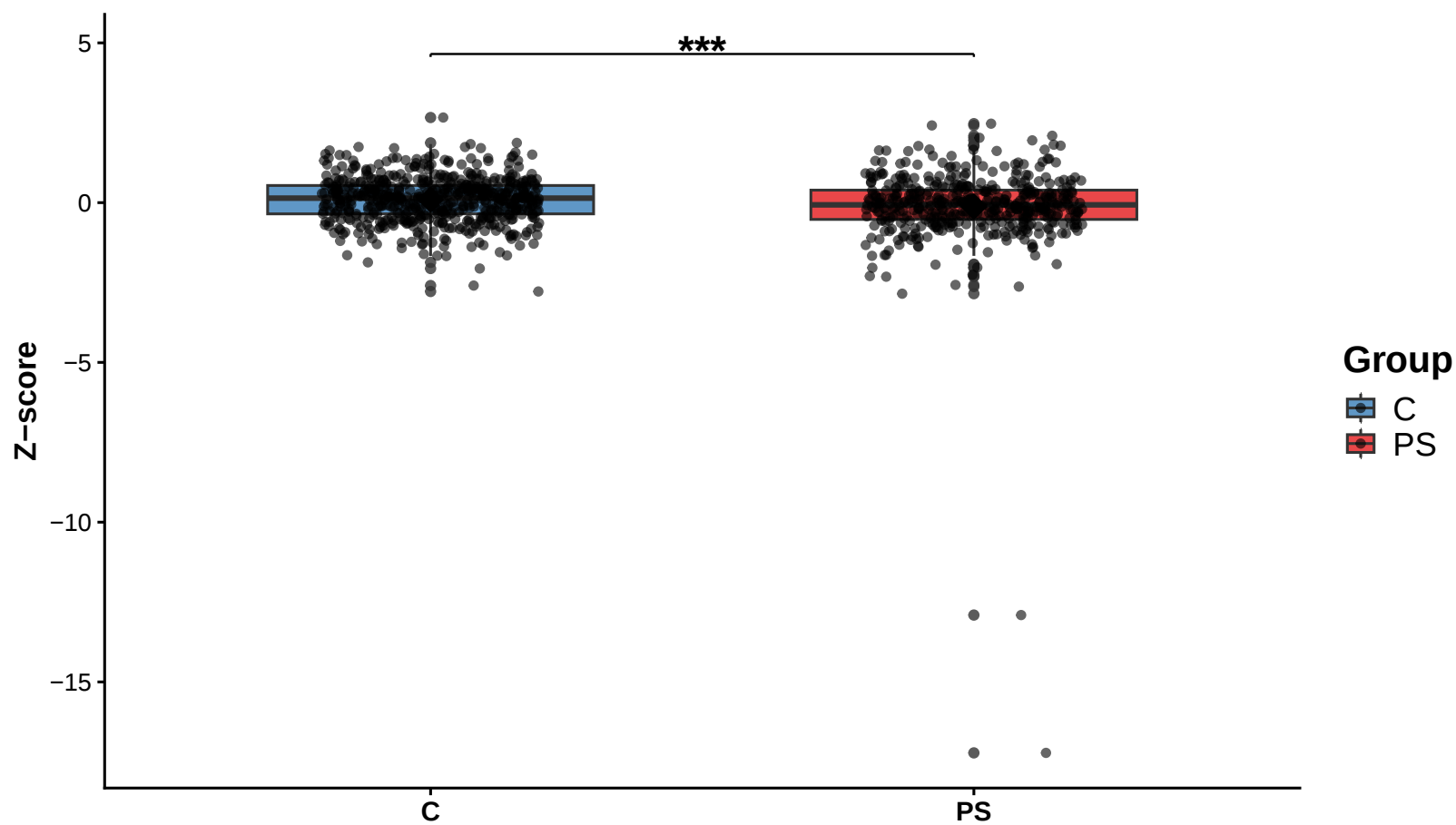
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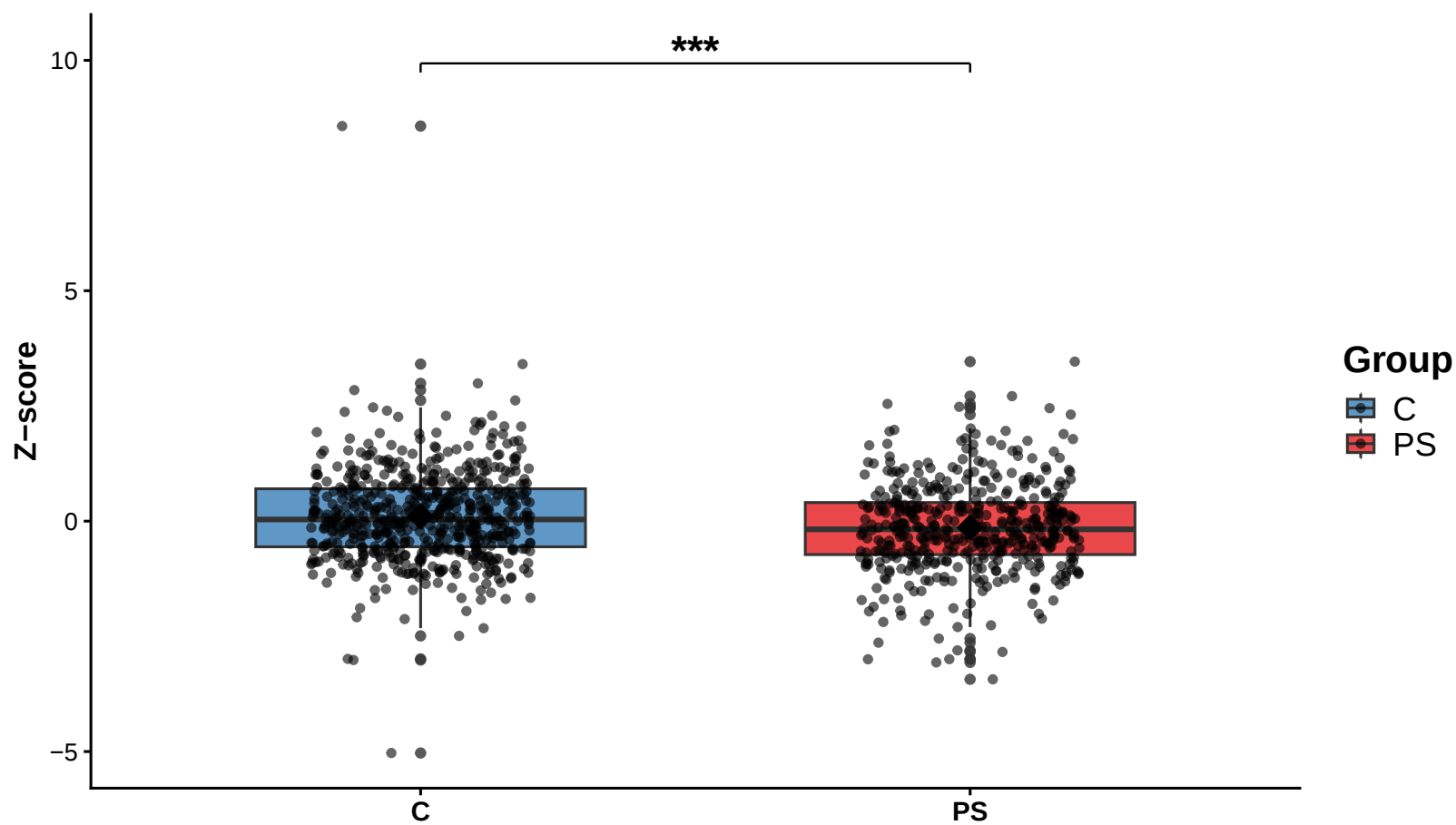
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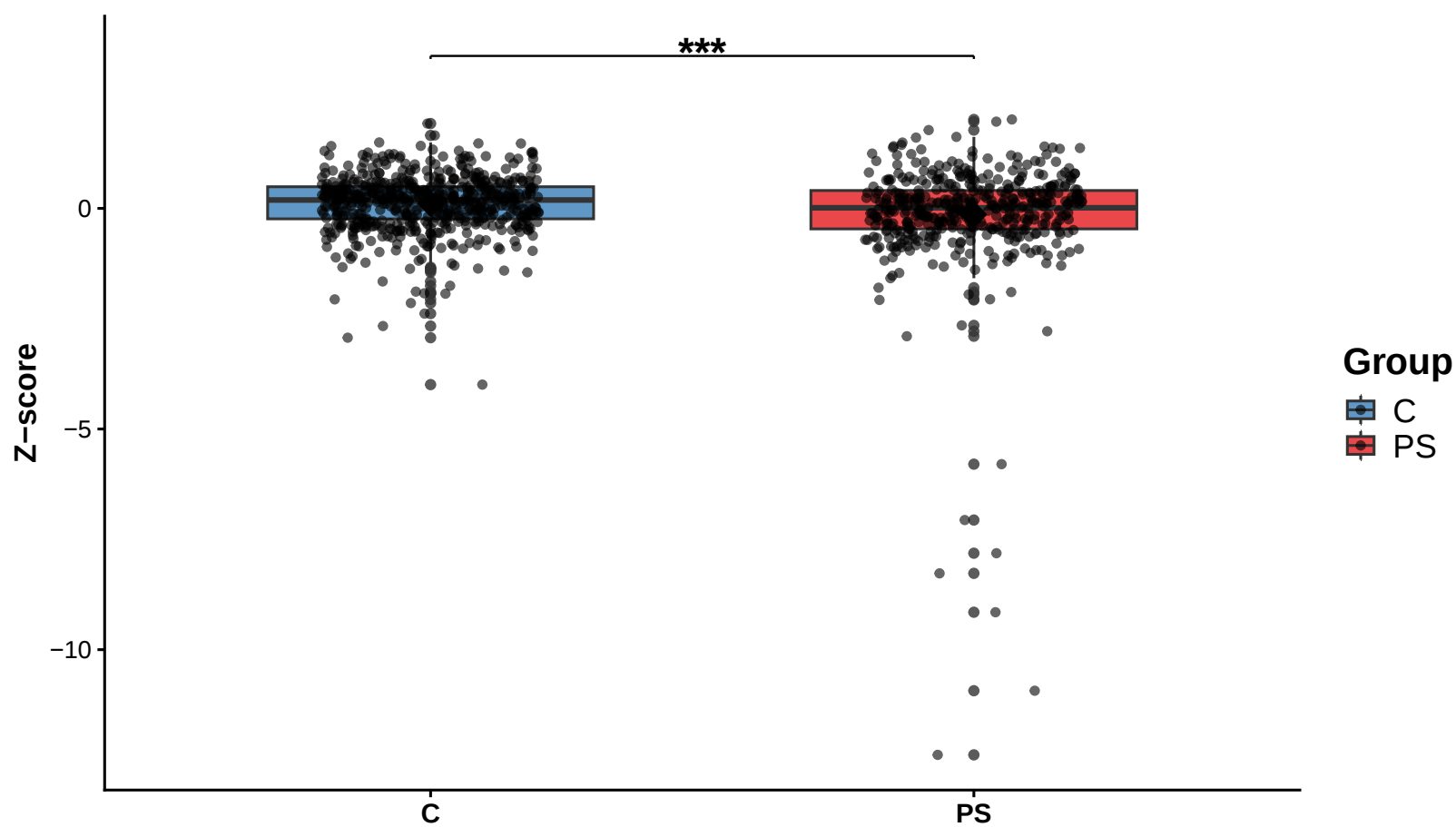
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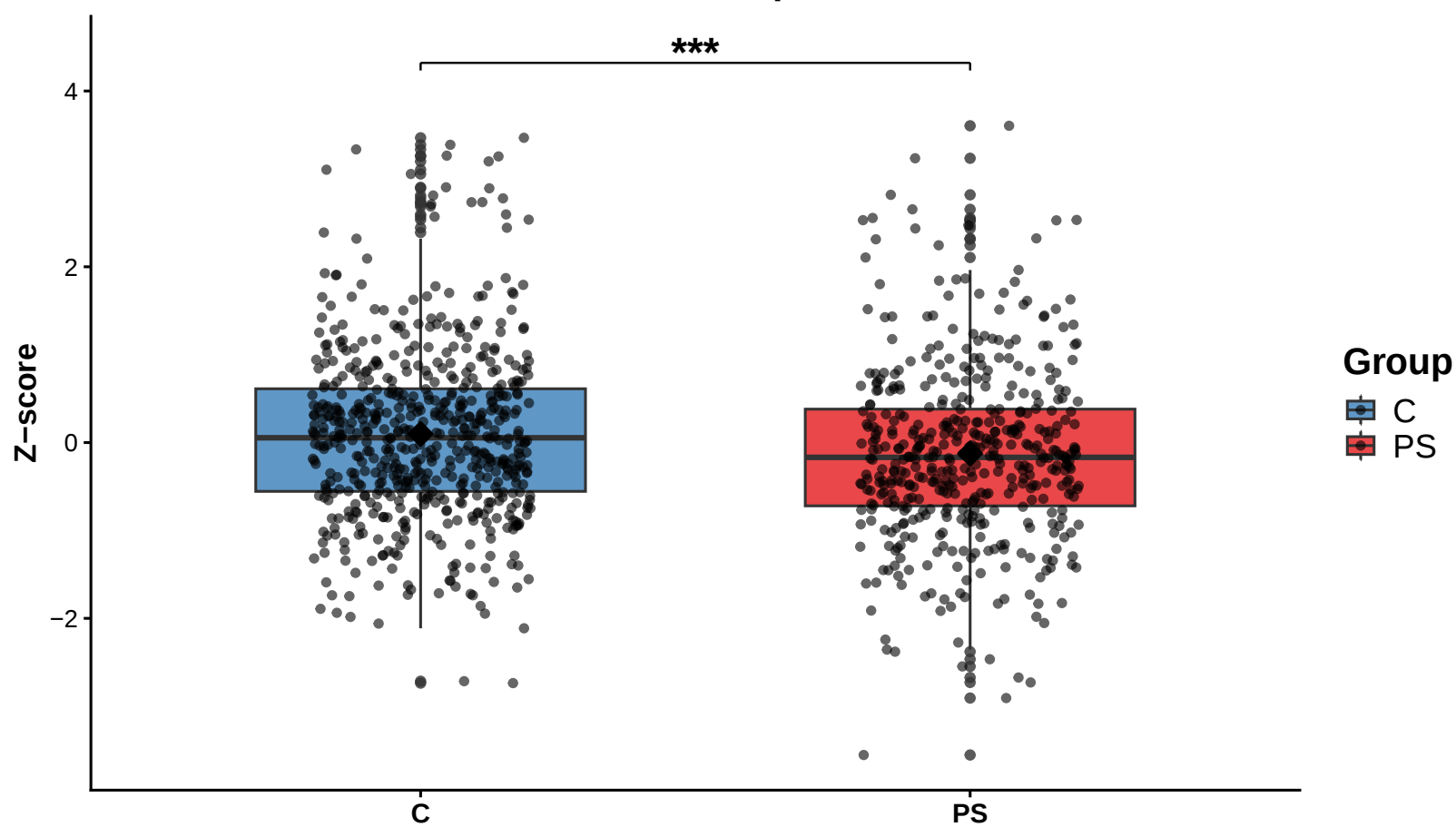
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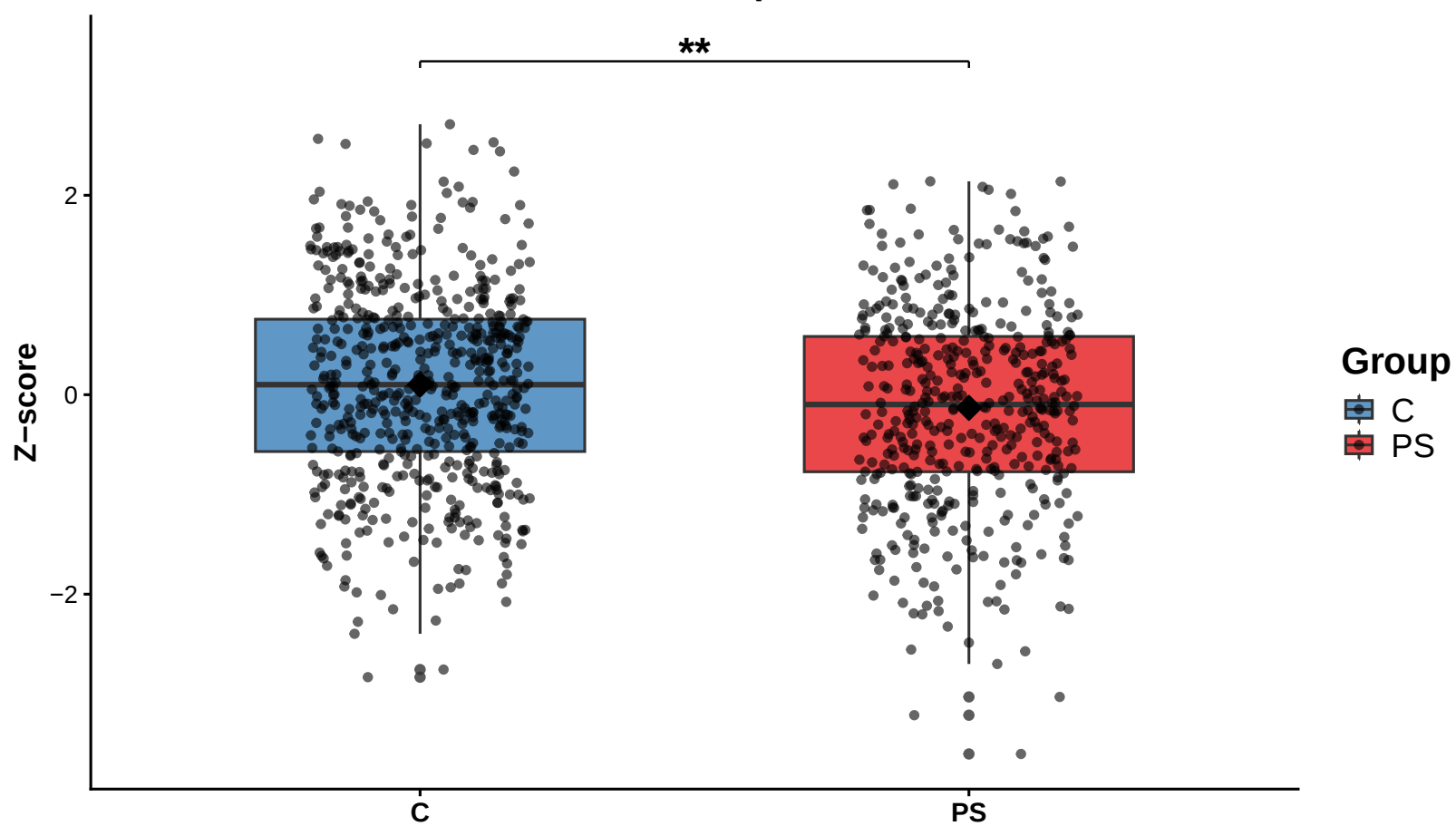
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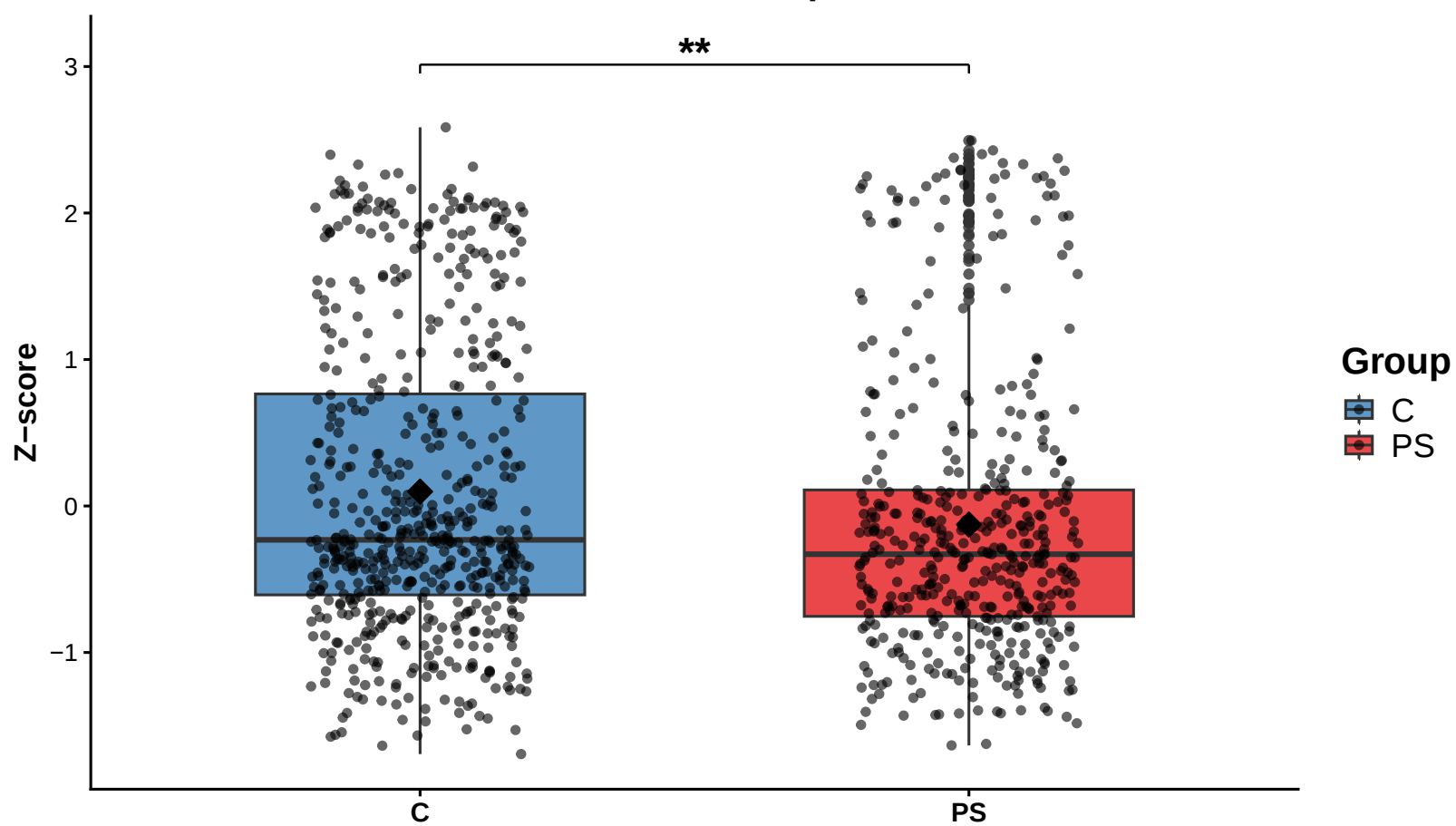
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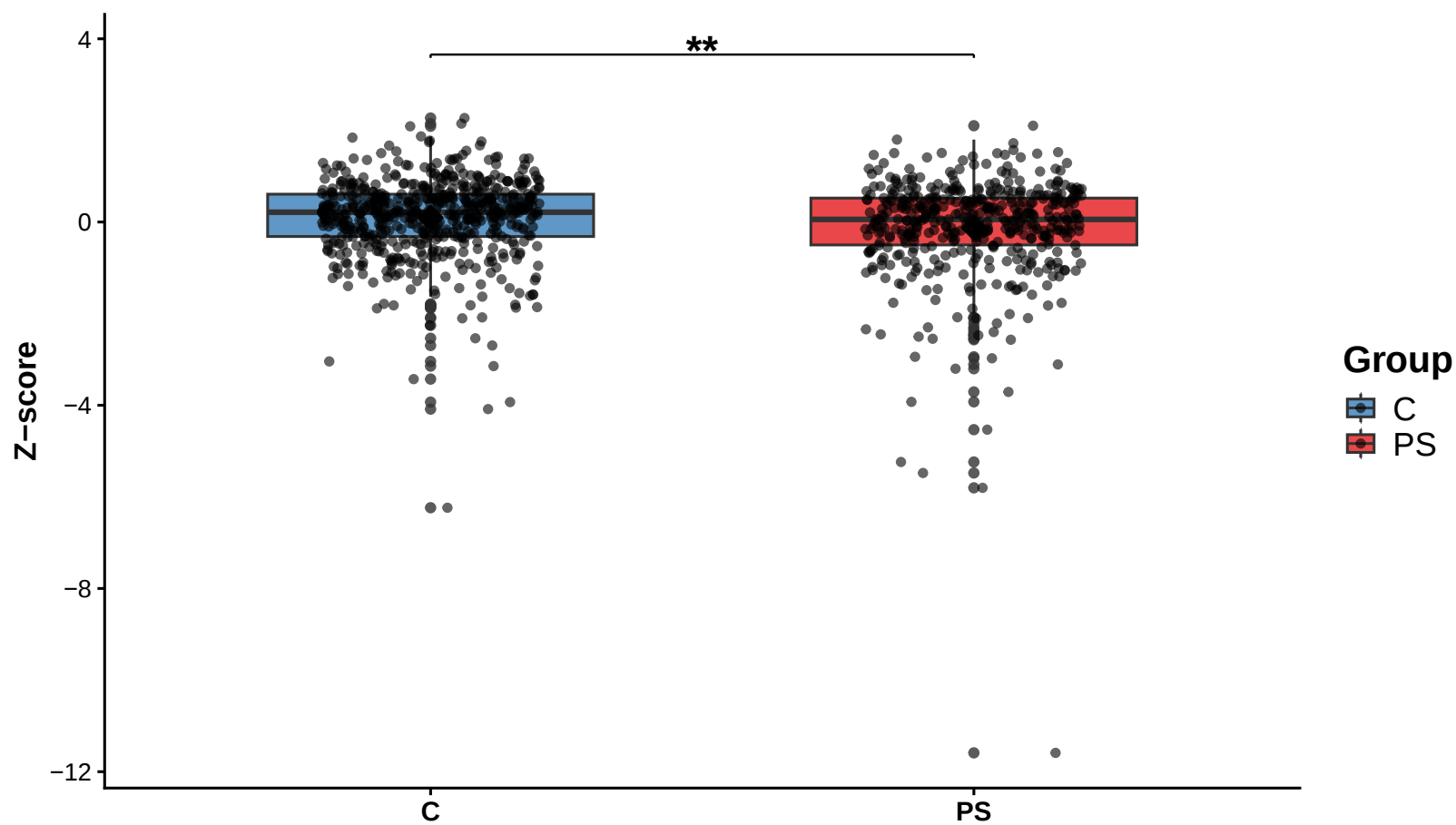
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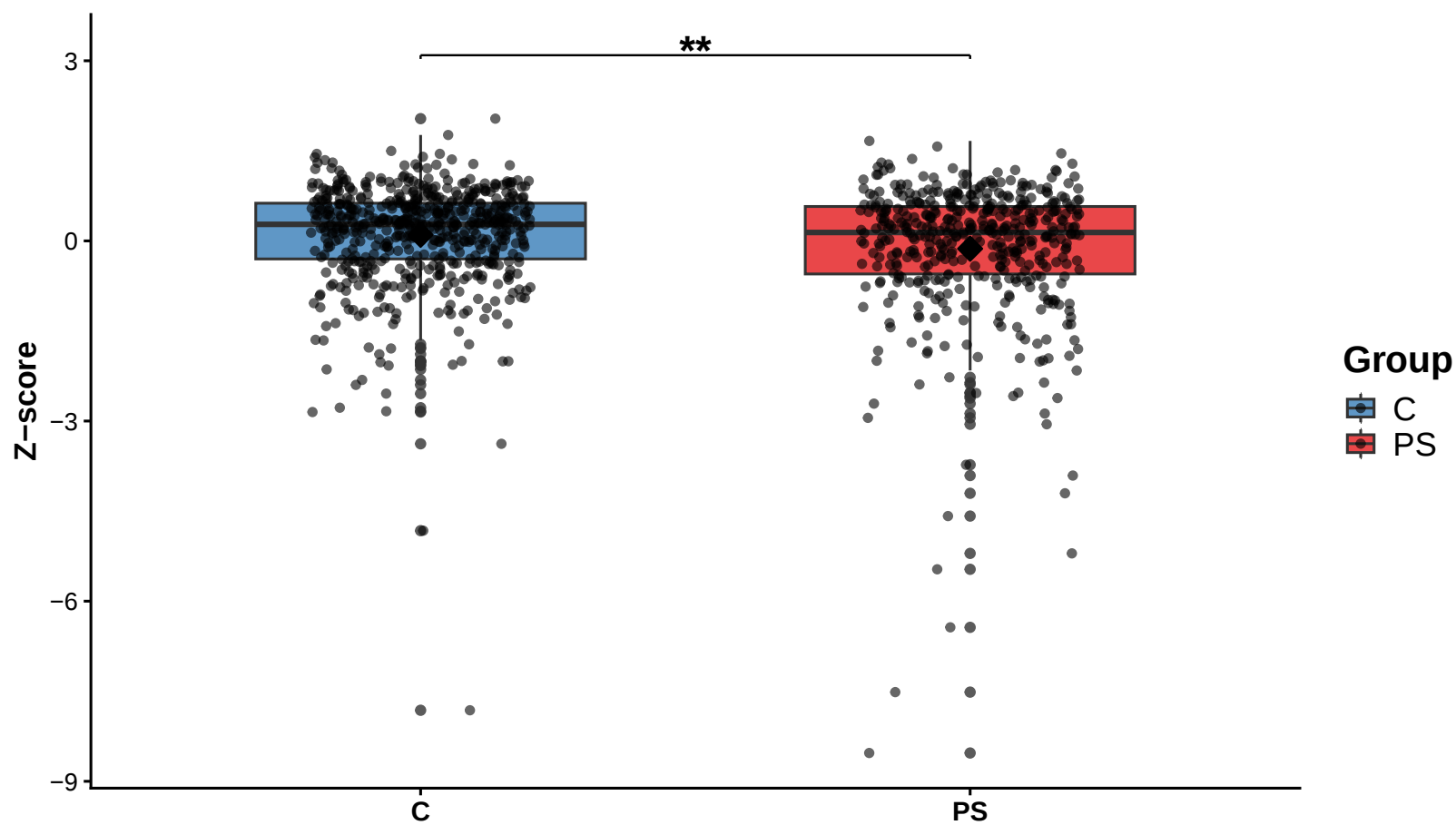
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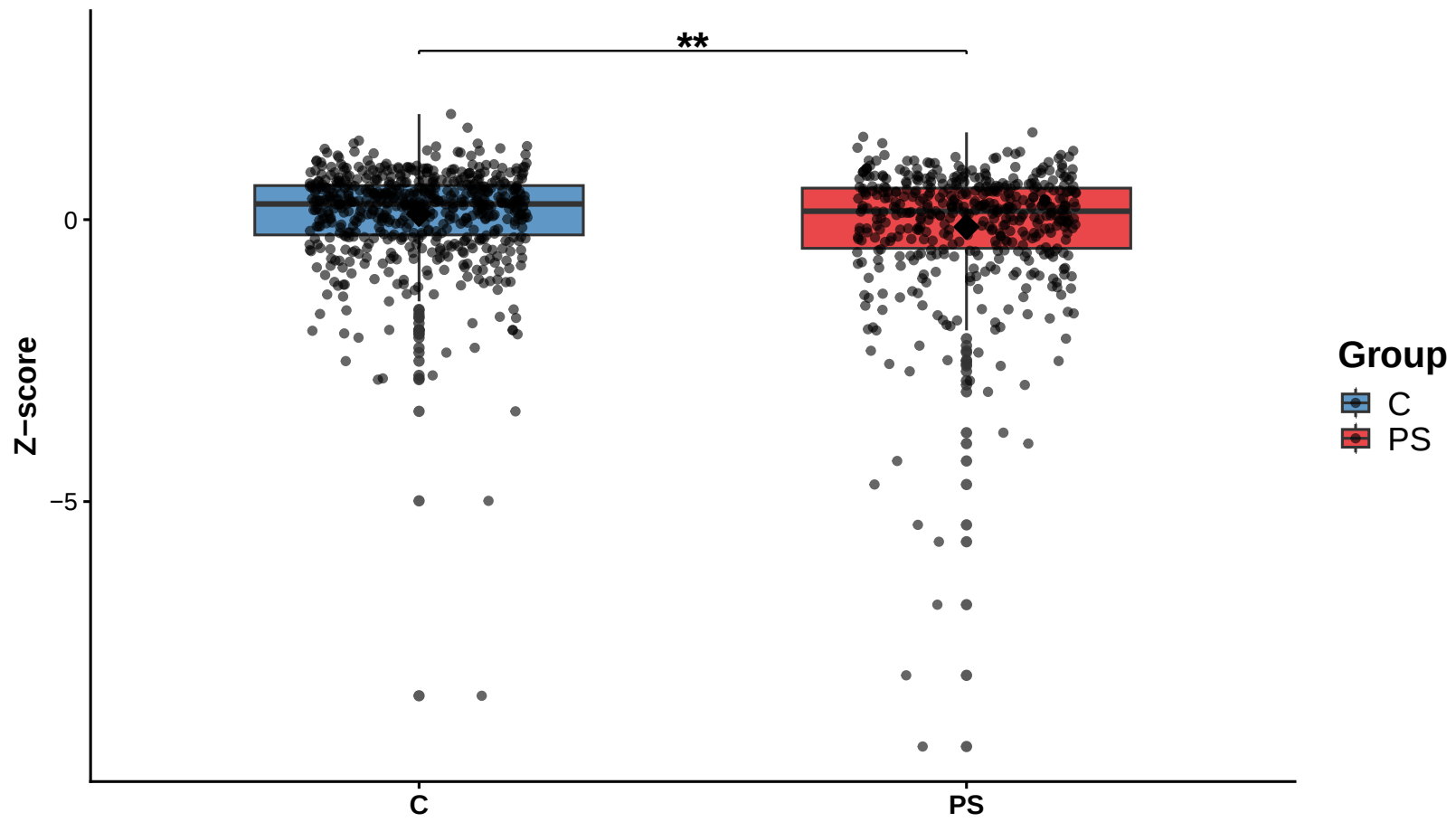
LDL_FC_by_CE



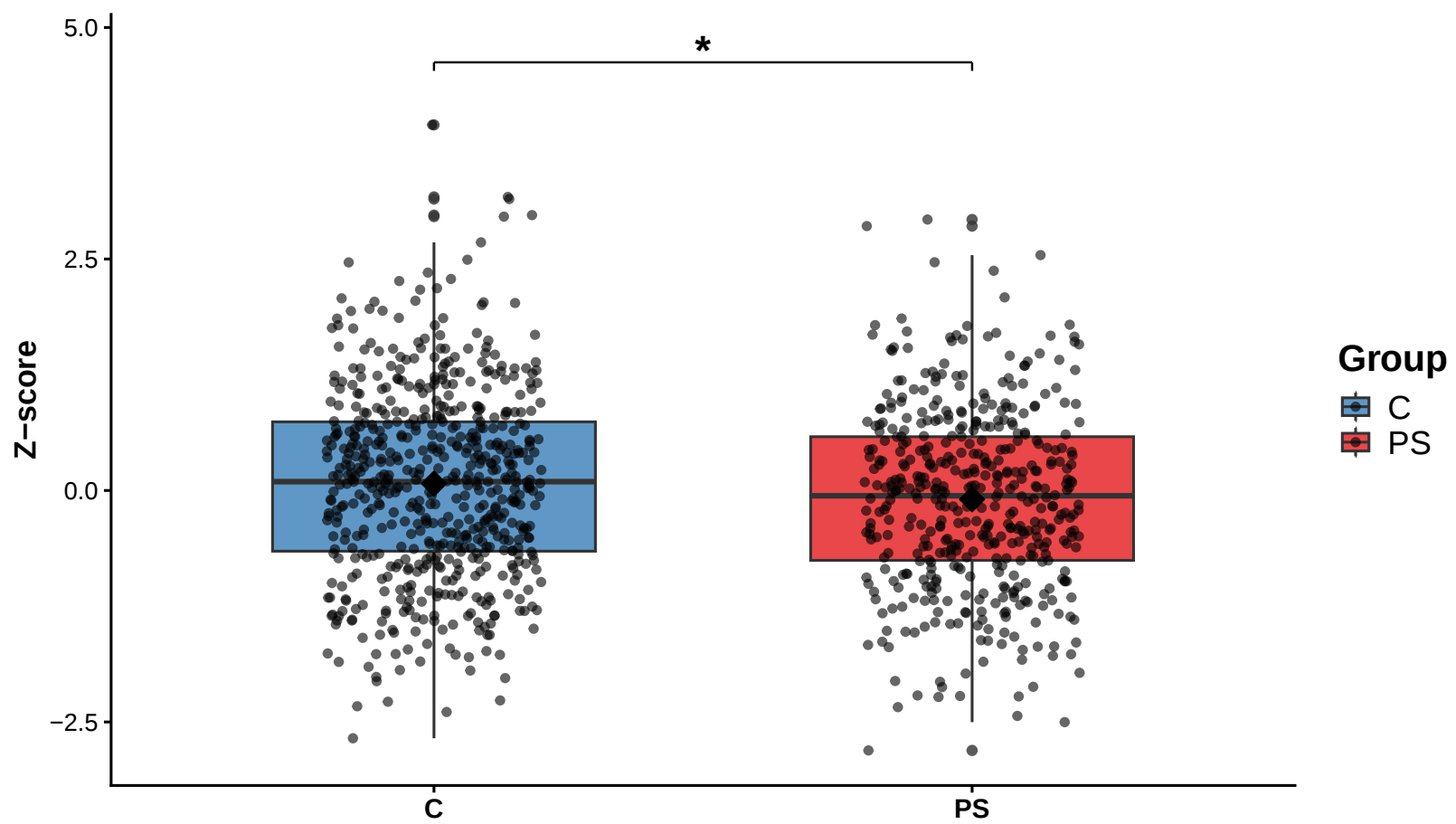
S_LDL_FC_by_CE



S_LDL_FC_pct_C



Phe



GlycA

