[illegible][1] [illegible][2],
[illegible][1] [illegible][2]

[illegible]

[illegible]

[illegible]

[illegible]

OF WISCONSIN

Abstract

[illegible]

[illegible]

[illegible]

i $, \ldots, m$ t_i

i T_i t_i

p_i P $|T_i| > |t_i|$ p i μ_i

i γ

μ_i i μ_i i

E_i $\{|t_i| > \gamma|\mu_i$ $\}$ i

γ i

i

E_i

$$PCE \quad P \; E_i \; .$$

$$FWE \quad P \quad {}_iE_i \; .$$

$FWE \geq PCE$ α

γ α

V

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	U	V	m
[illegible]	T	S	m
	Y	R	m

[illegible]

$$FDR \quad E\ V/R\ ,$$

[illegible] V/R [illegible] R [illegible]

$$FWE \quad P\ V >\ .$$

[illegible] V [illegible] R [illegible] V/R [illegible] $R >$ [illegible]

$$FDR \quad P\ R > \quad P\ V > \quad FWE.$$

[illegible]

F

[illegible] α [illegible] m [illegible] α' α/m [illegible] α [illegible]

$$FWE \quad P\ \ _iE_i \leq P\ E \quad \cdots \quad P\ E_m \quad m\alpha' \quad \alpha.$$

[illegible]

[illegible]

[illegible]

$$FWE \quad - P \; |T \,| \le \gamma, \ldots, |T_m| \le \gamma \quad - P \quad |T_i| \le \gamma \,,$$

[illegible]

[illegible]

$$P_{RF} \; p_i \;\approx\; - \; \bullet \; -E \; d \;,$$

[illegible]

$$E \; d \;\approx S \;\; \pi^{\,-(m+\;)/} \; W^{-m} p_i^{-m} \;\bullet\; -p_i / \;\; .$$

[illegible]

[illegible]

[illegible] $|T|$ [illegible] γ [illegible]

[illegible] $|T|$ [illegible] t [illegible] $|t|$ [illegible] n [illegible] T [illegible]

[illegible]

[illegible] $|T|$ [illegible]

[illegible] $|T|$ [illegible]

[illegible] α [illegible]

[illegible]

F

[illegible] q [illegible] $p_{( )} \le p_{( )} \le \ldots \le p_{(m)}$ [illegible] (i) [illegible] $p_{(i)}$ [illegible] r [illegible] i [illegible]

$$p_{(i)} \le \frac{i}{m}q.$$

[illegible] $( ), \ldots, (r)$ [illegible] r

[illegible]

$$p_{(i)} \leq \frac{i}{m} \frac{q}{\sum_i \;/i}.$$

[illegible]

$$pFDR \quad E\; V/R|R > \quad .$$

[illegible]

$$pFDR \quad p \quad P\; H_i \quad ||T_i| > \gamma\;,$$

[illegible] V S R [illegible] V [illegible] V $S\,p$ [illegible] p [illegible] H_i [illegible] $|T_i| > \gamma$ [illegible]

$$\begin{aligned} pFDR &\quad E\; V/R|R > \\ &\quad E_{R>}\; E\; V/R|R \\ &\quad E_{R>}\; p\, V \quad S\; /\; V \quad S \quad p. \end{aligned}$$

[illegible]

$$\begin{aligned} pFDR &\quad \frac{P\;\; |T_i| \geq \gamma|\mu_i \qquad P\;\; \mu_i}{P\;\; |T_i| \geq \gamma} \\ &\quad \frac{F\;\; \gamma\; \pi}{F\;\; \gamma}, \end{aligned}$$

[illegible] F [illegible] $|T_i|$ [illegible] i [illegible] F [illegible] $|T_i|$ [illegible] F [illegible]

$$pFDR \leq q \qquad p_{(i)} \leq \frac{i}{m} q.$$

[illegible] $R\ \gamma$ [illegible] γ [illegible] $R\ \gamma$ [illegible] $V\ \gamma$ [illegible] γ [illegible]

$$E\left[\frac{R\ \gamma}{R\ \gamma\ \ \ S\ \gamma}\right] \ [illegible] \ E\left[\frac{V\ \gamma}{V\ \gamma\ \ \ S\ \gamma}\right].$$

[illegible] $S\ \gamma$ [illegible]

$$S\ \gamma\ \ \ R\ \gamma\ - mp_{\gamma},$$

[illegible] $R\ \gamma$ [illegible] t_i [illegible] γ [illegible] p_{γ} [illegible] γ [illegible]

$$\widehat{FDR}_{YB}\ \gamma\ \ \ E\left[\frac{R\ \gamma}{R\ \gamma\ \ \ S\ \gamma}\right].$$

[illegible]

[illegible] γ [illegible] $S\ \gamma$ [illegible]

[illegible] B [illegible] $b\ b\ \ ,\ldots,B$ [illegible]

[illegible] b [illegible] $R^b\ \gamma$ [illegible] $|t_i^b|$ [illegible] b [illegible] γ

[illegible]

$$\widehat{FDR}_{YB}\ \gamma\ \ \ \sum_{b=}^{B}\left[\frac{R^b\ \gamma}{R^b\ \gamma\ \ \ S\ \gamma}\right].$$

[illegible] $p_{(\ )} \leq p_{(\ )} \leq \ldots \leq p_{(m)}$ [illegible] (i)

$p_{(i)}$

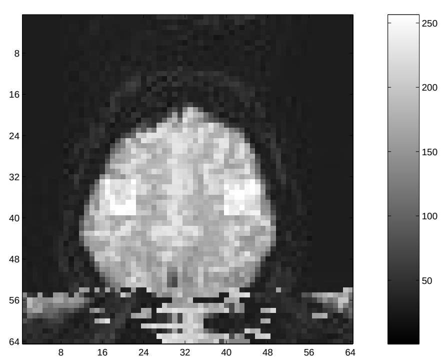
$p_{(i)}$ $\widehat{FDR}_{YB}$ $p_{(i)}$ r

i $\widehat{FDR}_{YB}$ $p_{(i)} \leq \alpha$ $( ), \ldots, {}_{(r)}$

F

$\times$

$\times$



p

n

$$Y \quad X \quad B \quad E$$

$$n \times p \quad n \times q \quad q \times p \quad n \times p$$

q

X $n \times$

n n

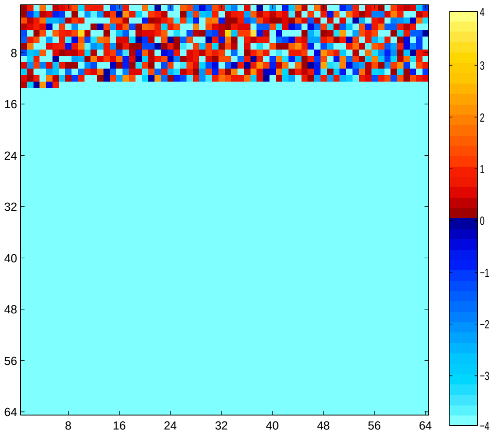
[illegible]

$$B(i,j) = e^{-\frac{(i-i')^2+(j-j')^2}{2(2)}}.$$

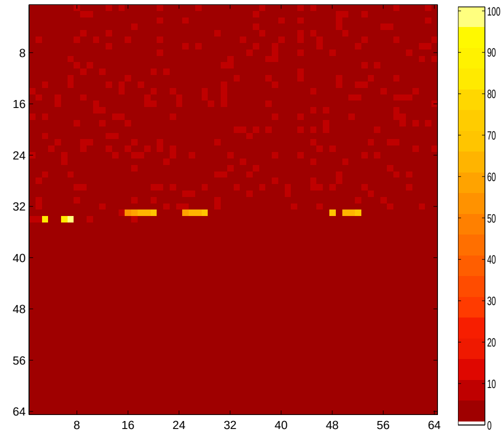
[illegible]

[illegible]

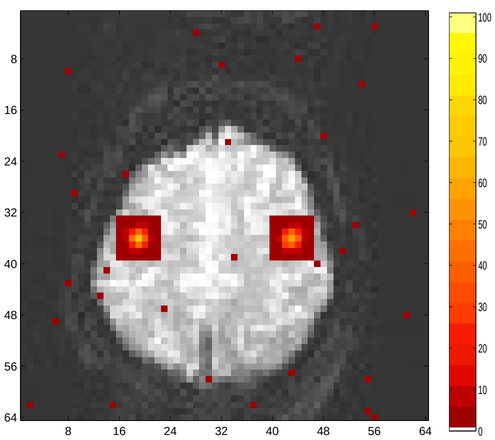
[illegible]



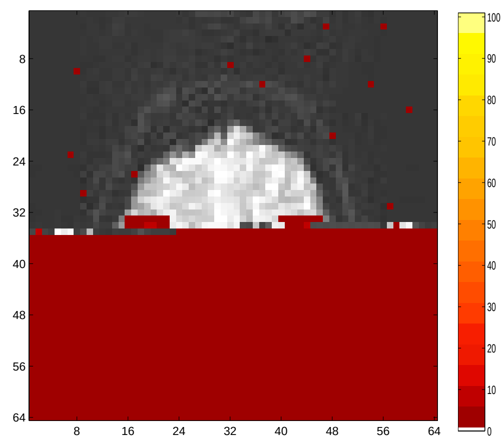
(a) Sample t-statistic image



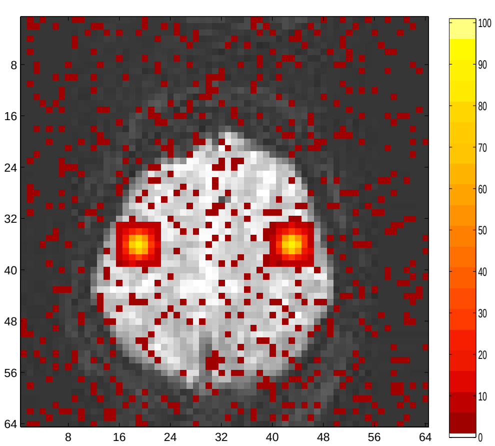
(b) Unadjusted threshold



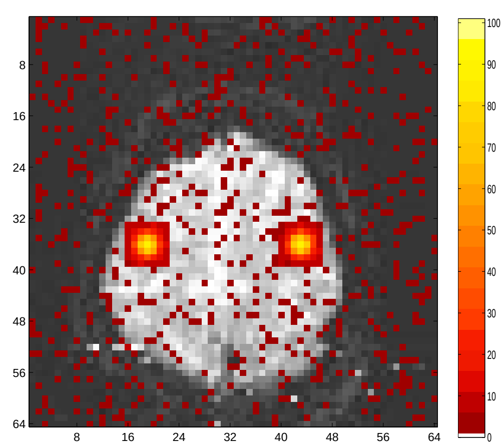
(c) FWE Bonferroni method



(d) FWE Permutation method

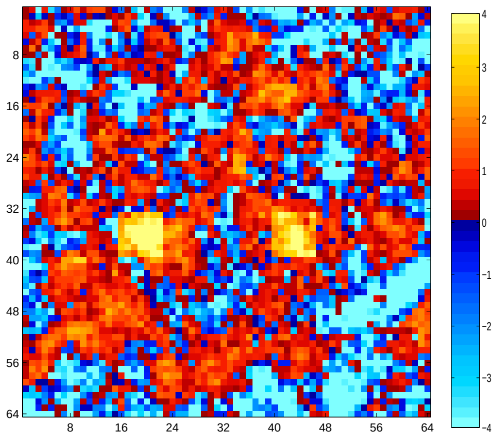


(e) FDR BH method

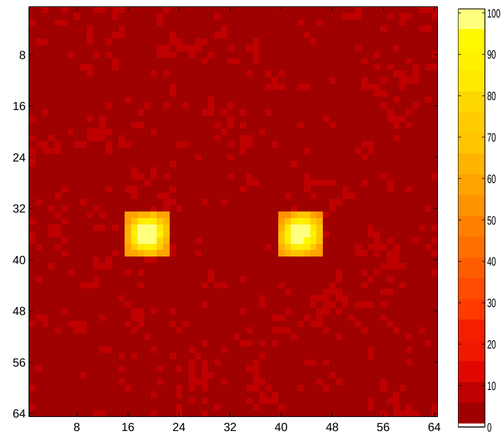


(f) FDR YB method

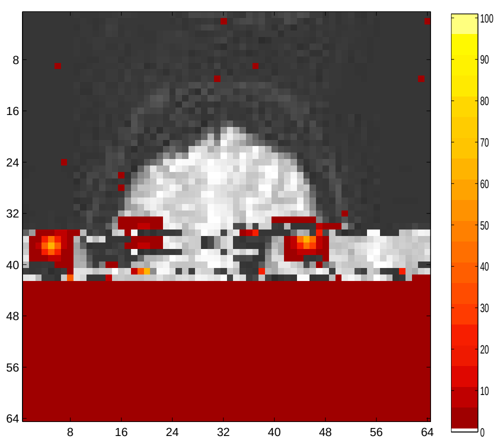
[illegible]



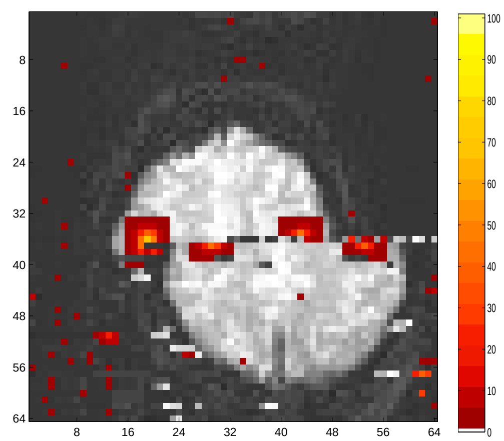
(a) Sample t-statistic image



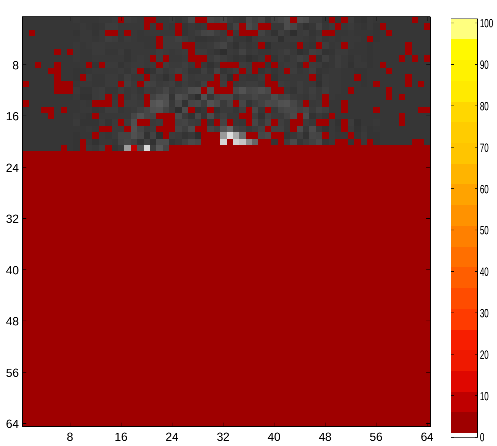
(b) Unadjusted threshold



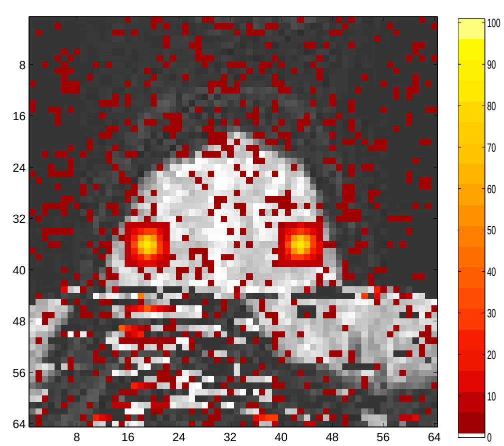
(c) FWE Bonferroni method



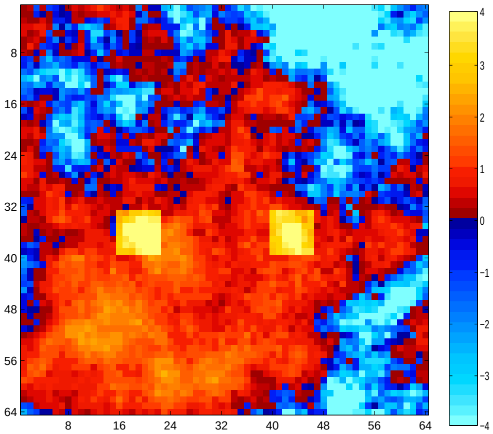
(d) FWE Permutation method



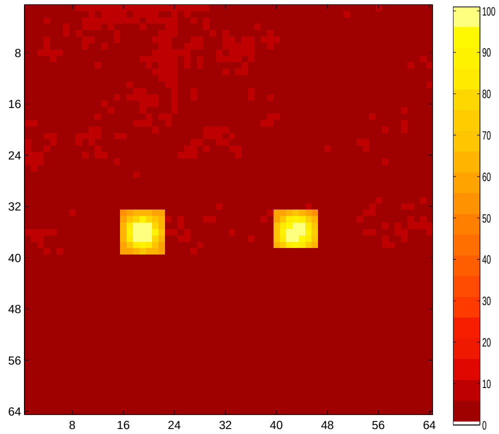
(e) FDR BH method



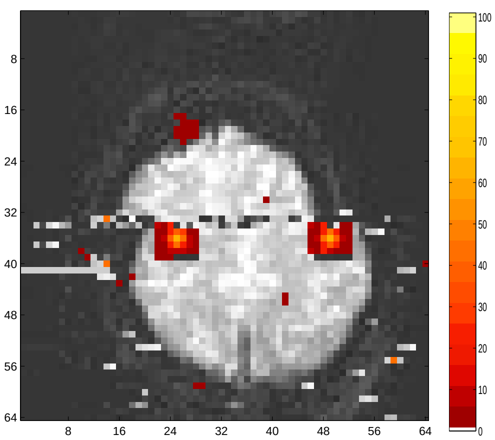
(f) FDR YB method



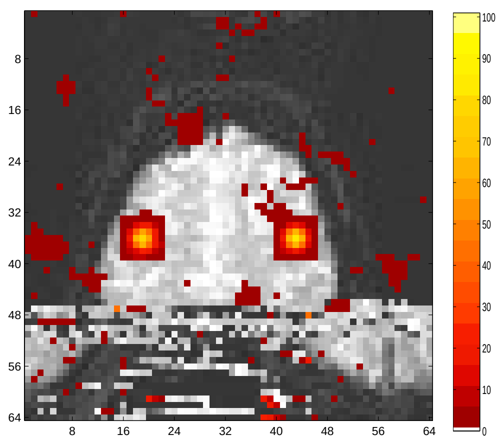
(a) Sample t-statistic image



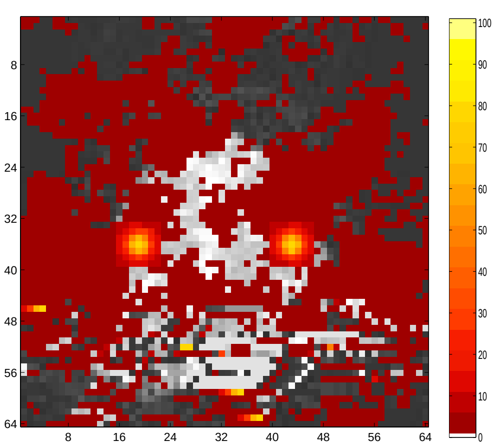
(b) Unadjusted threshold



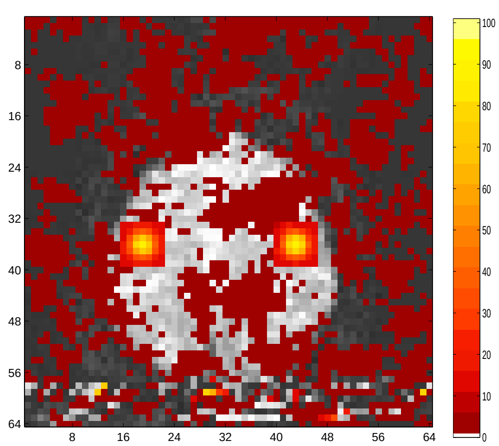
(c) FWE Bonferroni method



(d) FWE Permutation method

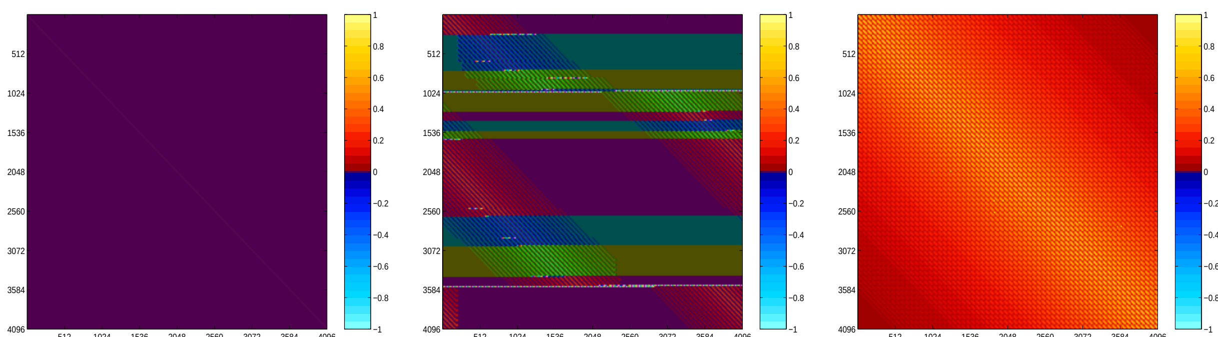


(e) FDR BH method



(f) FDR YB method

[illegible]



(a) ρ = .00

(b) ρ = .70

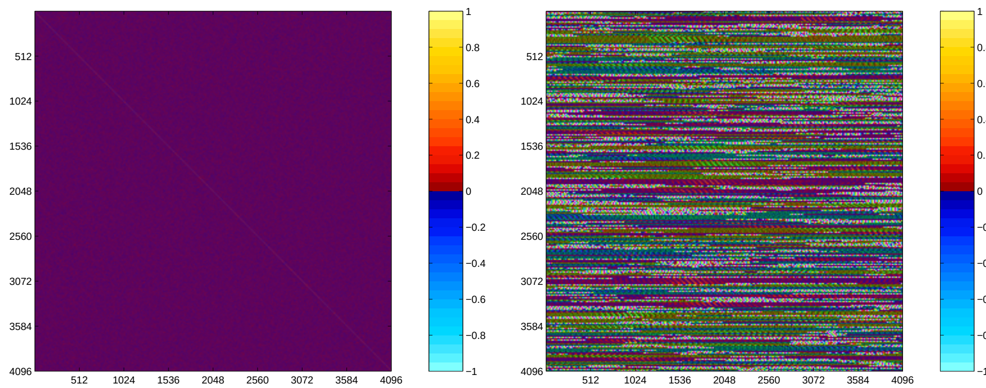
(c) ρ = .95

	ρ	ρ	ρ

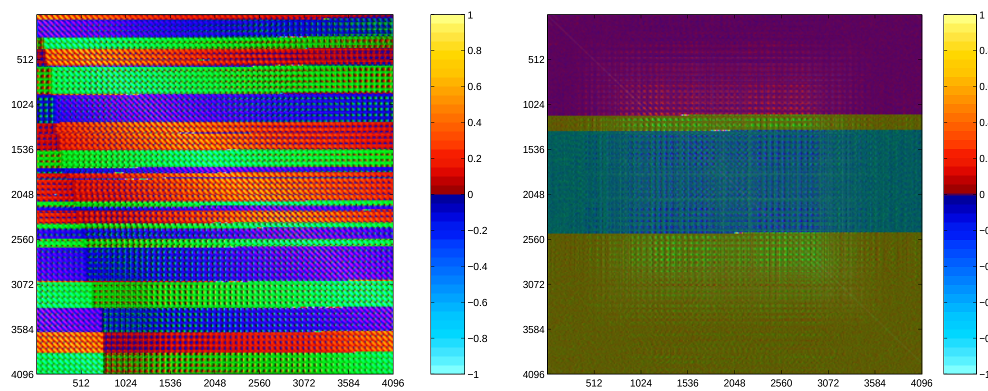
(a) power

(b) FDR

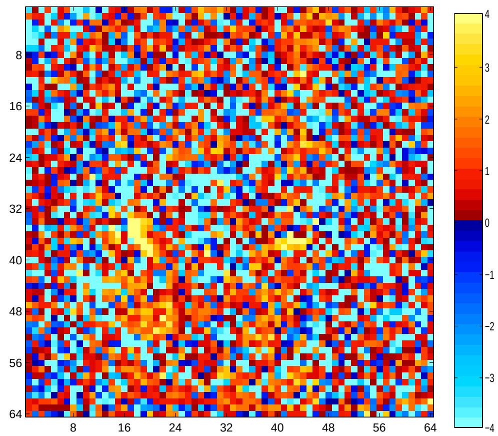
(c) FWE



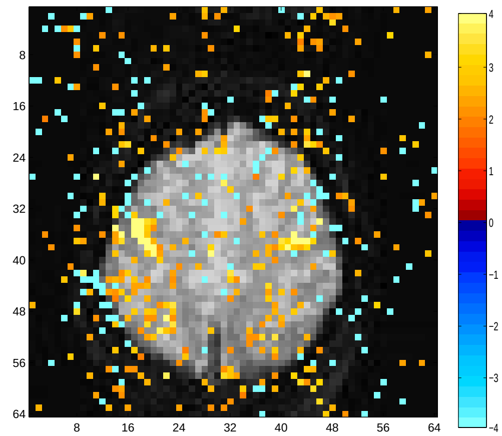
(a) ρ = .00 (b) ρ = .70



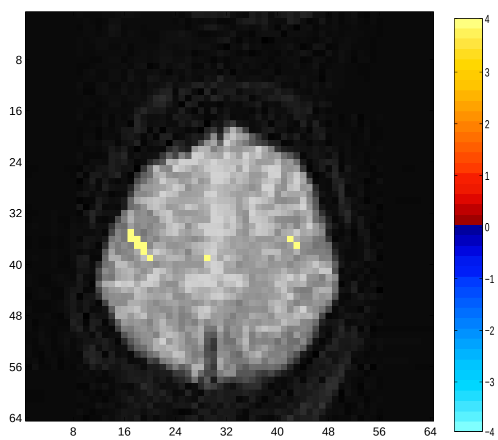
(c) ρ = .95 (d) real dataset



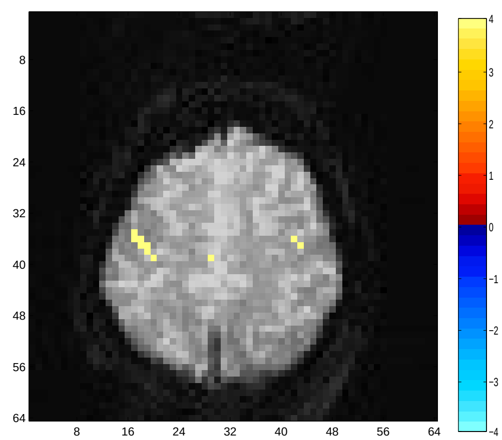
(a) Sample t-statistic image



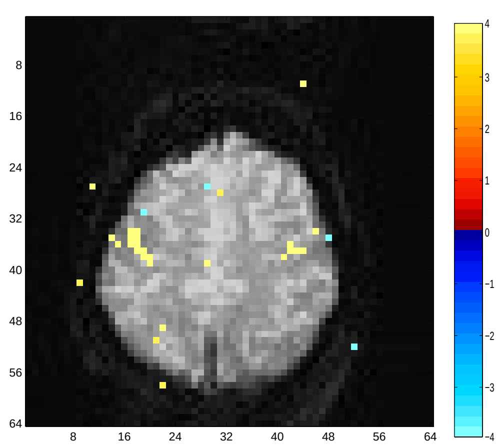
(b) Unadjusted threshold



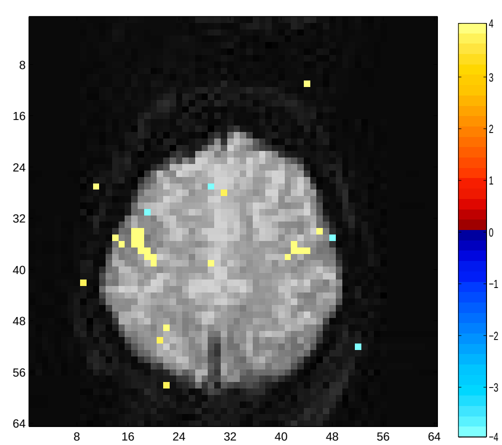
(c) FWE Bonferroni method



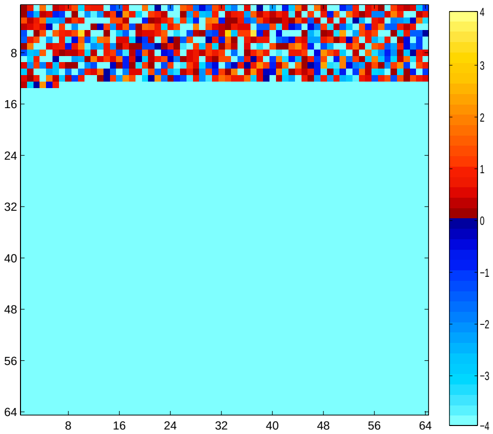
(d) FWE Permutation method



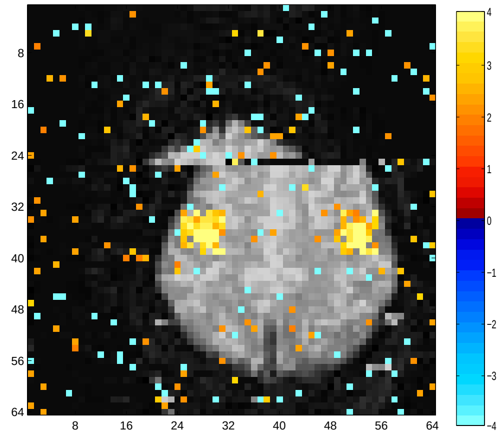
(e) FDR BH method



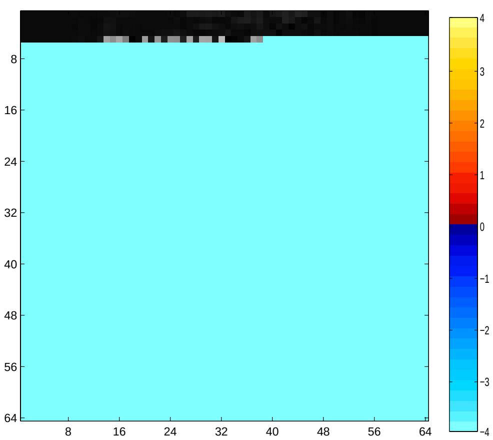
(f) FDR YB method



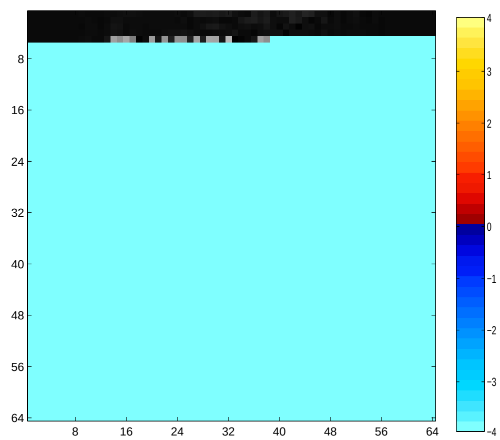
(a) Sample t-statistic image



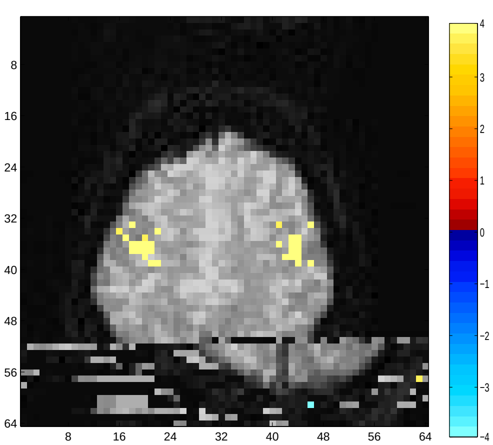
(b) Unadjusted threshold



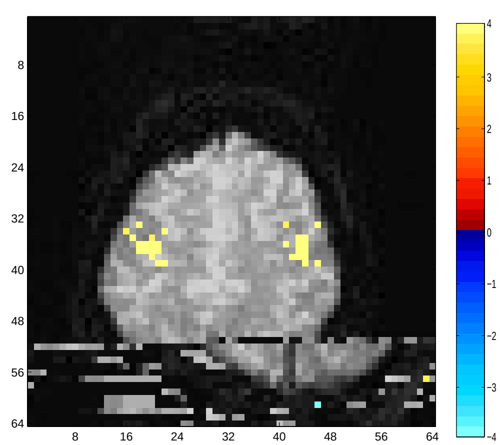
(c) FWE Bonferroni method



(d) FWE Permutation method

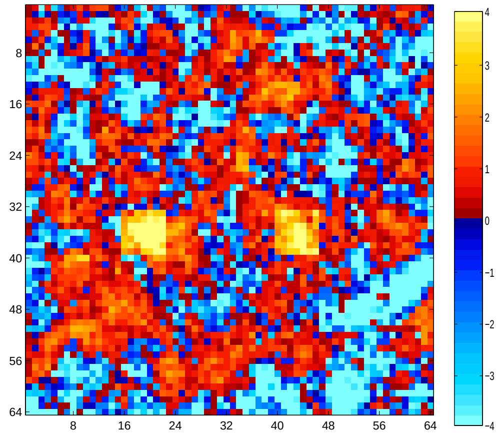


(e) FDR BH method

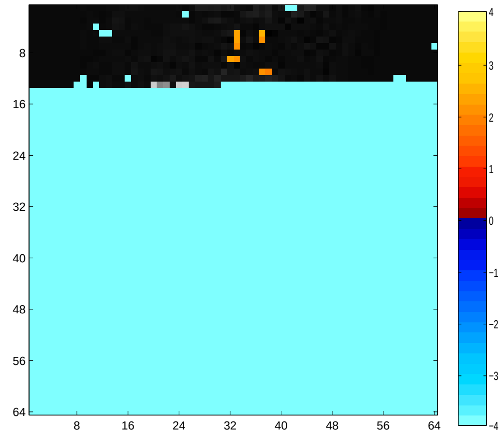


(f) FDR YB method

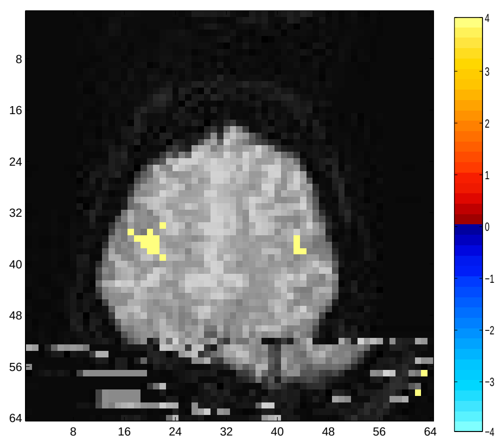
[illegible]



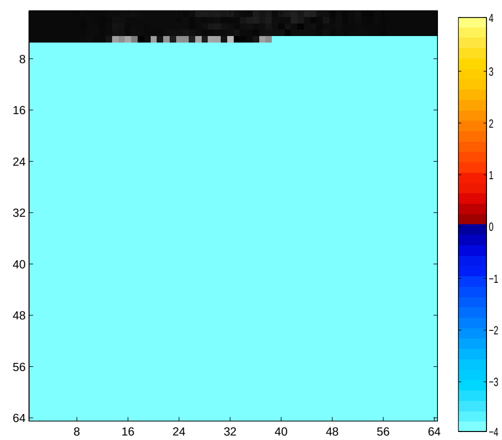
(a) Sample t-statistic image



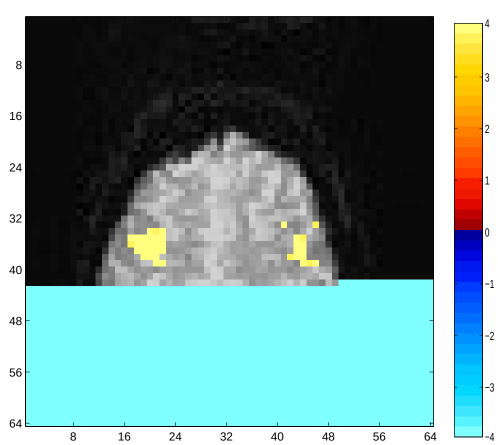
(b) Unadjusted threshold



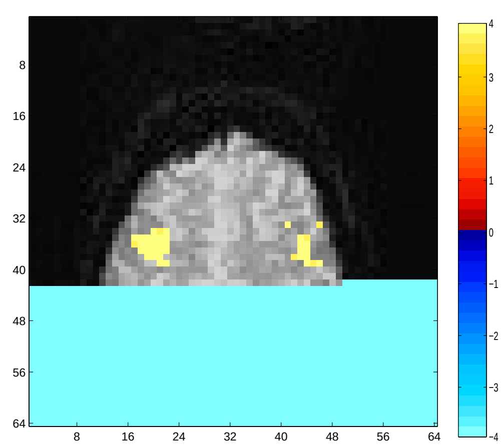
(c) FWE Bonferroni method



(d) FWE Permutation method

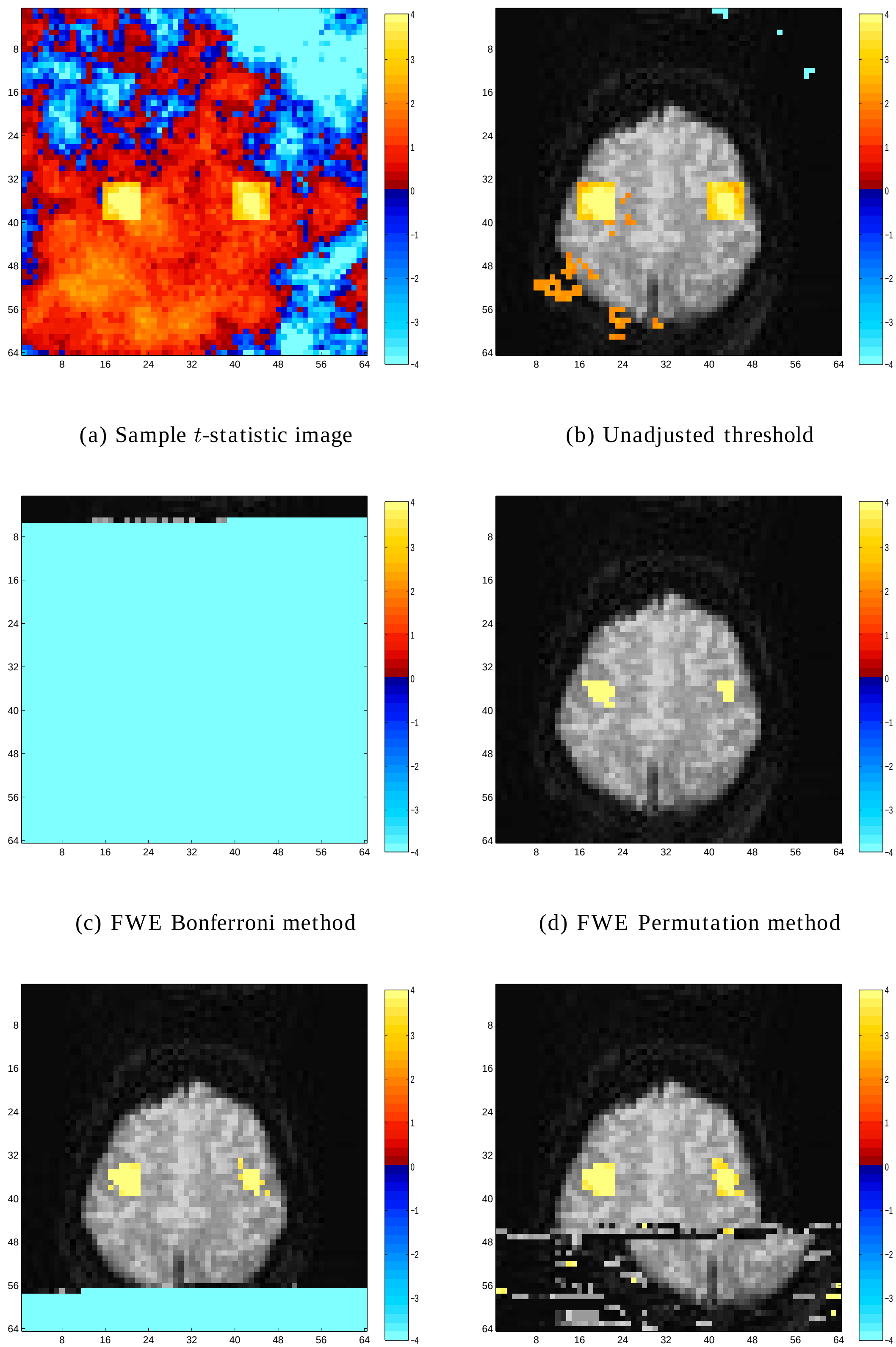


(e) FDR BH method



(f) FDR YB method

[illegible]



(a) Sample t-statistic image

(b) Unadjusted threshold

(c) FWE Bonferroni method

(d) FWE Permutation method

(e) FDR BH method

(f) FDR YB method

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

1. Bandettini, P.A., Jesmanowicz, A., Wong, E.C., and Hyde, J.S. (1993). Processing strategies for time-course data sets in functional MRI of the human brain. [illegible], **30:** 161-173.

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