1HZ <RUN 6WDWH 5HJHQWV ([DPLQDWLRQ L

)LHOG 7HVW $QDO\VLV (TXDWLQJ 3URFHGXUH DQG 6FDOLQJ 2SHUDWLRQDO 7HVW)RUPV

7HFKQLFDO 5HSRUW

3UHSDUHG WKH 1HZ <RUN 6WDWH (GXFDWLRQ 'HSDUWPHQW E\ 3HDUVRQ

-DQXDU\

7KH 0DQWHO&RX&UH DQG 6WDQGDUGL]HG 0HDQ 'LIIHUHQFH

7KH 0DQWHO$FRQGLWLRQDO PHDQ FRPSDULVRQ RI WKH F
IRU UHIHUHQFH DQG IRFDO JURXSV FRPELQHG RYHU YDOX
32UGHUHG´ PHDQV WKDW D UHVSRQVH FDWHJRU\ LV DVVLJQHG D QXPHULFDO YDOXH VR WKDW
UHVSRQVH HDUOLHU LQ JRDO 3´FRLQFLGHV ZLWK HDUOLHU LQ &´RQGLWLRQDO
RWKHU KDQG UHIHUV WR WKH FRPSDULVRQ RI PHPEHUV IU
VDPH VFRUH RQ WKH PDWFKLQJ YDULDEOHV WR WKRVH LQ RX

*URXS	,WHP 6FRUH			7RWDO
	\	\	« \W	
5HIHUHQ	Q 1	Q 1	« Q 1W	Q 1
)RFDO	Q 2	Q 2	« Q 2W	Q 2
7RWDO	Q N	Q N	« Q NW	Q N

)LJXUH î t &RQWLQJHQF\ 7DEOH /D\RXW N

)LJXUHUR=PZLF'RQRJKXH *ULPVKRZV DFRîQWLQJHQF\ WDEO
WKH RI. OHYHOV WZKHSUHVHQWV WKH QXPEHU RI UHVSRQV
UHSUHVHQWV WKH QXPEHU RI OHYHOV RI WKH RZ DFKLQJ
UHSUHVHQWV FRUWHKVH WKDW FDQ EH JDLQHG RQ WKH WHVP
WKH QXPEHUV RI IRFDO DQG UHIHUHQFH YHORRS WKRP DUH
YDULDEOH DQG JDLQ 3 7KH WRWDO QXP
LQGH=[LFHV DW 7KH 0DQWHO VWDWLVWLF LV GHILQHG

$$\text{Mantel} = \frac{\left| \sum_k \left(F_k - E(F_k) \right) \right|^2}{\sum_k \mathrm{Var}(F_k)}$$

LQ ZKLFK HSUHVHQWV WKH VXP RI VFRUHV RYHU WKH RIIRFDO
PDWFKLQJ YDULDEOH DQG LV GHILQHG DV IROORZV

$$F_k = \sum_t y_t n_{Ftk}$$

7KH H[SHFW)DXQGHU RI WKH QXOO K\SRWKHVLV LV

$$E(F_k) = \frac{n_{F\,k}}{n_{\,k}} \sum_t y_t n_{Ftk}$$

7KH YDULDQFH GHU WKH QXOO K\SRWKHVLV LV DV IROORZV

$$\mathrm{Var}(F_k) = \frac{n_{R\,k} n_{F\,k}}{n^2{}_k (n_{\,k} - 1)} \left(n_{\,k} \sum_t y_t^2 n_{tk} - \left(\sum_t y_t n_{tk} \right)^2 \right)$$

8QGHU WKH 0DQWHO VWDWLVWLFDO GHVLJQ D E\SRWKHVLV ZLWK
IUHHGRP ,Q ',) DSSOLFDWLRQV WKH E\SRWKHVLV WKDW
DQG IRFDO JURXSV ZKR DUH VLPLODU LQ RYHUDOO WHVW
SHUIRUPDQFH RQ WKH LWHP)RUPDOHVWLQJ VWDWLVWLFDO
+DHQV]HO VWDWLVWLF ZLWKRXW WKH FRQWLQXLW\ FRU

WR WKH UHPDLQGHU RI WKHLQDZVRQLWLRQ WKHDWPQVK
WKH UDZ DQG VFDOH VFRUHV EHFDPH WKH EDVH VFDOH

7KH 5DVFK GLIILFXOW\ SDUDPHWHUV IRU WKH LWHPV RQ
UDZ VFRUH WR 5DVFK VWXGHQW DELOLW\ WKHWD VFR

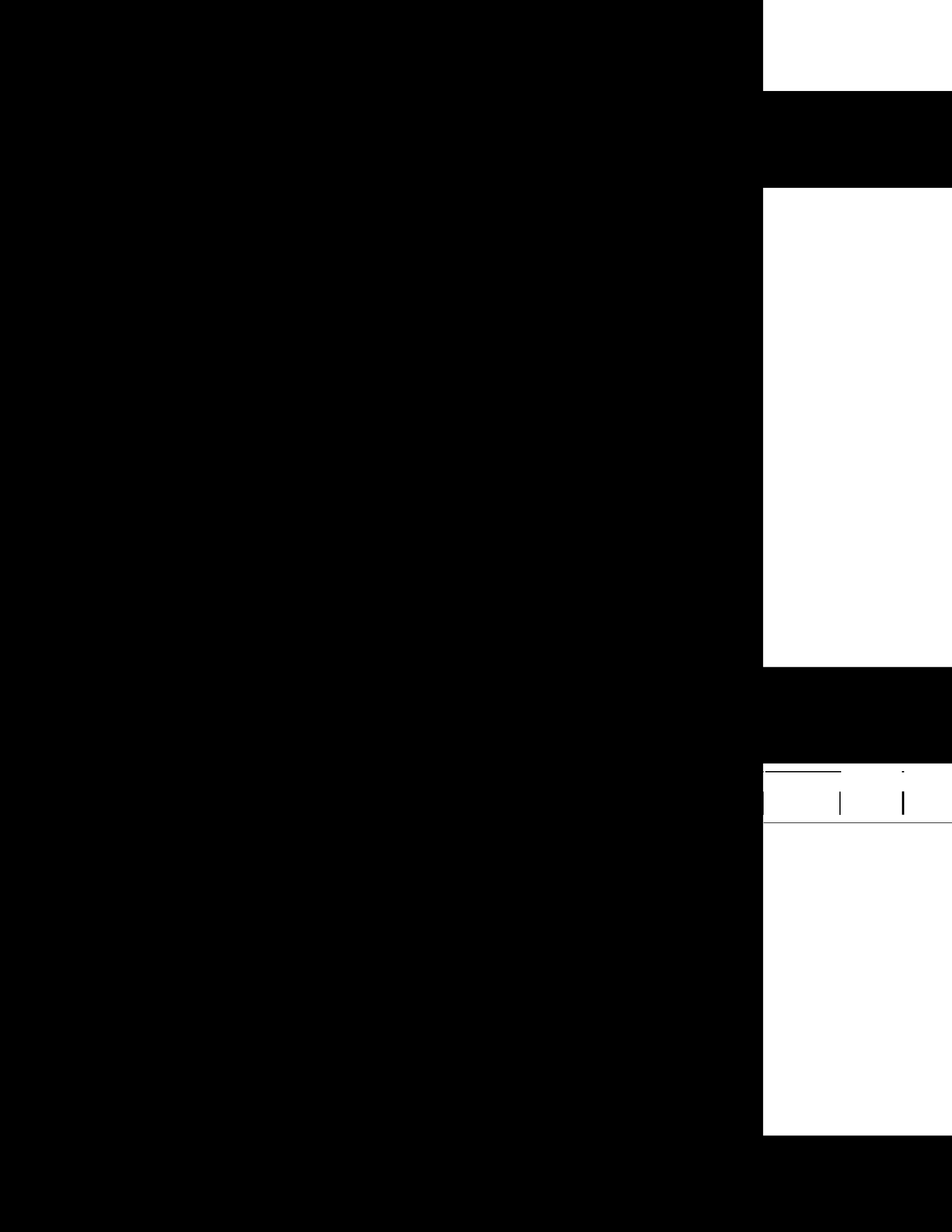
)RUP	,WHP	6FRUH 3RLQWV	'LIIHUHQFH)LUVW 5HDG 0LQXV 6 í	í			

)RUP	,WHP	6FRUH 7RWDO 3RLQWV	1V&RXQW	$JUHHPHQW			5DZ 6FRUH 0HDQ		5DZ 6FRUH 6WDQGDUG ,QWUD:HLJKWHG &RUU .DSSD			
				([DFW	$GM	7RWDO	)LUVW 5HDG	6HFRQG 5HDG	)LUVW 5HDG	6HFRQG 5HDG		

3UHSDUHG IRU 1<6(' E\ 3HDUVRQ

çáDn÷áDdfT

3UHSDUHG IRU 1<6(' E\ 3HDUVRQ



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3RVLV										