1HZ <RUN 6WDWH 5HJHQWV ([DPLQDW
*OREDO +LVWRU\ DQG *HRJUDSK\

7HFKQLFDO 5HSRUW

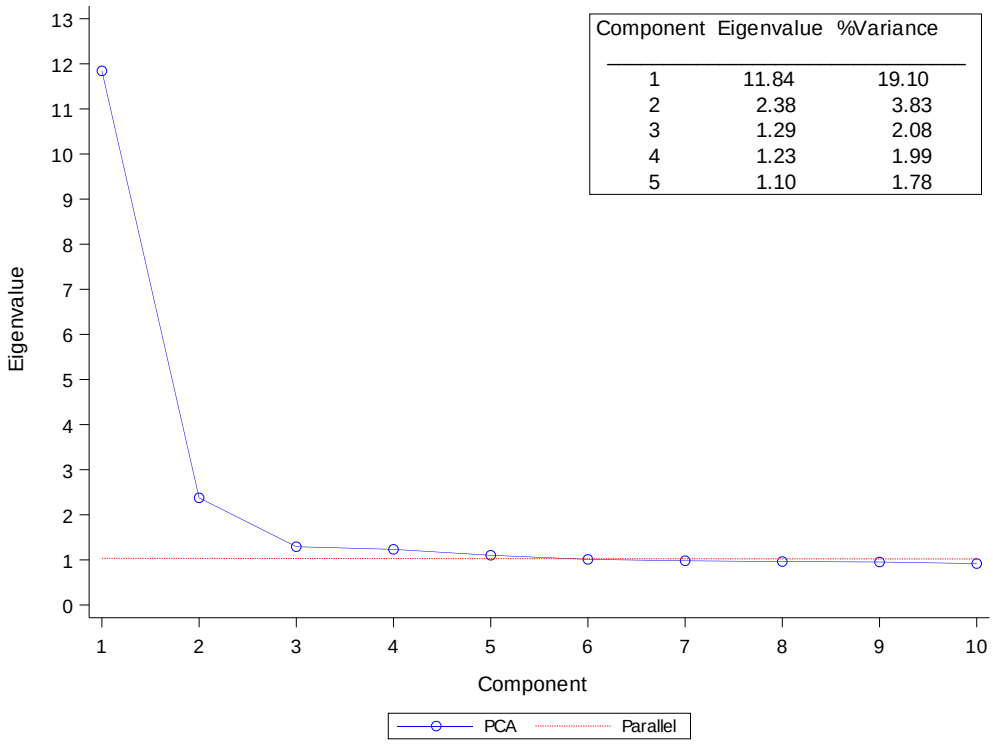
3UHSDUHG IRU WKH 1HZ <RUN 6WDWH (GXFDWLRQ
E\ 3HDUVRQ

0DUFK

+LVWRU\ DQG *HRJUDSK\ PD\ DOVR EH XVHG WR VDWLVI\ YDU

7DEO'HHVFULSWLYH 6pWDWLVWLFDO &RUUHODWLRQ 5H
([DPLQDWLRQ EDQG +DQGR*UH\RJUDSK\

&KDSWHU ,57 &DOLEUDWLRQV (TXDWLRQV 6WDQGDUGV DQG



)LJXUH FUHH 3OHWQW ([DPLQLQJ WKH EHQG LQ WKH *UHHQ JUDSK\

/RFDO ,QGHSHQGHQFH

/RFDO LQGHSHQGHQFH /, LV D IXQGDPHQWDO DVVXPSW VWDWLVWLFDO SXUSRVHV WKDW RQH LWHP WKH H[DPLQHH RI RQH LWHP RQ WKH W;HWWDWQLRQ FRPSULVHG ;RI; LW[HP ORFDOO\ LQGHSHQGHQW WKHQ WKH SUHE

3 HS UHG U 1< E\ 3 DU RQ

UHVSRQVHV WR WKHVH WZR LWHPV DV VKRZQ EHORZ %DVH
FDQ EH GHULYHG

$$P(X_i = x \mid X_j = x_j, T) = P(X_i = x_i \mid T)P(X_j = x_j \mid T)$$

0DUDLV DQG $QGULFK SRLQW RXW WKDW ORFDO LWH
RFFXU LQ WZR ZDYHV WKDW DUH [RQO\ ORRVHO\ FRXSOHG 7KH ILUVW ZD\ R
DVVXPSWLRQ RI XQLGLPHQVLRQDOLW\ LV YLRODWHG +HUH
GRPLQDQW GLPHQVLRQ GHWHUPLQH VWXGHQW SHUIRUPDQFH
7KH VHFRQG RFFXUV ZKHQ UHVSRQVHV WR DQ LWHP GLIIHU RQ
7KLV LV D YLRODWLRQ RI VWDWLVWLFDO LQGHSHQGHQFH DQ
GLVWLQJXLVKLQJ WKH WZR VRXUFHV RI ORFDO GHSHQGHQF
LQGHSHQGHQFH FDQ EH UHODWHG WR XQLGLPHQVLRQDOLW\
WKHUHIRUH UHTXLUH GLIIHUHQW WHVWV

5HVLGXDO LWHP FRUUHODWLRQV SURYLGHG LQ :,167(36 IRU
WKH ORFDO GHSHQGHQFHV ([DPLQDWLRQ RI WKH SDLUZLVH
LWHPV ,Q JHQHUDO WKHVH FRUUHODWLRQV SURYLGH)LUVW H[SO
EDVHG RQ WKH 5DVFK PRGHO 7LVDQ DQG WLHWMHQ SHDUVRQ HVW
GHYLDWLRQV WHVWHG DQG REV
GHWHUPLQHG IRU HDFK LWHP)LQDOO\ IRU HDFK LWHP SDL
GHYLDWLRQV LV FRPSXWHG

7KUHH W\SHV RI UHVLGXDO FRUUHODWLRQV DUH GHYHORSHG
ORJLW ,W LV QRWHG WKDW WKH UDZ VFRUH UHVLGXDO FRU
LQGH[D SRSXODU VWDWLVWLF XVHG WR HDVH WKH
VWDWLVWLF LVí DSíSURZLKHQ WR ORFDO HGHSHQGHQFHV OHQ
<HQ 7KXV WKH HYHQ SXHFWV VKRXOG EHí SSRUR[LPDWHO\
WKH H[SDEPVROXWH [LYDOXHV WKDW DUH JUHDWHU WKDQ
GHSHQGHQFH WKDW SHUPDQHQWO\GVWRUWHG HYHOSHUV &KHQ

6LQFH WKH WKUHH UHVLGXDO FRUUHODWLRQV DUH YHU\ V
FRUUHODWLRQ´ LQ :,167(36 ZDV XVHG IRU WKHVH DQDO\VHV

7DEOH KRZV WKH VXPPDU\ VWDWLVWLFV DQG GHYLDWLRQ PL
DQG VHYHUDO SHUFHQWLOHV IRU DOO GXDO UHVLGXDO FRUU
WHVW 7KH WRWDO QXPEHU RI LWHP SDLUV DQDO\]HG
FRUUHODWLRQV JUHDWHU WKDQ DUH ZLWKLQ WKH H[SHFWHG
ZLWKLQ REVHUYHG GHYLDWLRQ JUHDWHU WKDQ
YHU\ VOLJKWO\ QHJDWLYH DQG VLJQLILFDQWO\ GLIIHUHQW
YDORXH VXJJHVWLQJ WKDW LWHP LQGHSHQGHQFH 5HJHQHUDO
([DPLQDWLRQ RI WKH REVHUYHG +LQGVRFUDWLF

7 D E O H X P P D U \, R I 7 H D Q 6 T X D U H 6 W D W L V W L F D O 3 R V W E R Q L Q
+ L V W R U \ G * H R J U D S K \

	INFIT Mean Square					
	N	Mean	SD	Min	Max	[0.7, 1.3]
Global History and Geography	62	1.00	0.09	0.85	1.29	[62/62]

, W H P V I R U W K H J O R E D O + L V W R U \ ([D P L Q D W L R Q + L J K \ I L H O G W H V W
D Q G D Q G D a L –! G –# * H42_0 12 Tf 213.77 587.86 Td 0560057 1 <0002

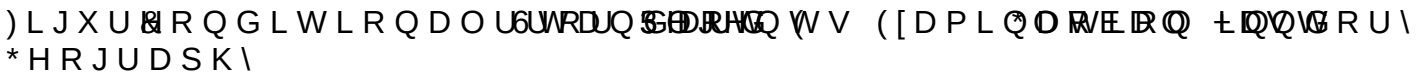
5HOLDELOLW\ FRHIILFLHQWV UDQJH IURP WR 7KH LQ
YDULDQFH WHVW ,I DOO WHVW VFRUH YDULDQFHV ZHUH WUXH V
ZRXOG EH SXUH UDQGRP QRLVH L H HDLQG HP[HDW KLHYHG D H
VFRUHV ZRXOG EH SHUIHFWO\ FRQVLVWHQW L H FRQ
YDOXHV RI DUH QHYHU DFKLHYHG LQ H
G HW U2.aE4 rWbEYDpZ\x*HAWK HA QG F\DAv WDWR'HKDxHQF0\G@E\
&RHIILFLHQW $OSKD
5HOL@PLOLW\ LV P UU0 YDO XPHP ’ëÂ/&“6%• Hp/\

7KH UHODWLRQVKLSV EHWZHHQ FDLVH QVRFVRUHH[SUHVVLEOH LQ
PDWKHPDWLFDO IRUPDEHGHRHXWKHLUHGSRO\QRPLDO UHODWL
WKH UDZ DQG VDQWKHVFRRUQHOLQHDU UHODWLRQVKLS EHWZHH
VFRUHV ,Q DGGLWLRQ HDXDWWKHG IURP \HDU WR \HDU WKH U
UDZ DQG VFDOH VFRUHV PRYHVWDKZGHGIUHHP SWRKHQRRUPLJLQDUHO
RQH WKDW LV DOVR QR OHVV HIIHFWLYH IRU ,Q
VLPSOH PDWKHPDWLFDO VFRUHV WKH
DYDLODEOH MRURHDFKLD 5DVFK ,57 FDQQRW EH FRQYHUWHG
PHWULF

7KH XVH RI 5DVFK ,57 WR VFDOH DQGLQHDWDOHWKHYEHJH
PDNH LWVLSEOH WR FDOFXODWH &6(0V XVLQJ WKH SURFHGXU
èSDQtWyR½Q õvUiÐÀ4Ø¥ EWHR&p0FQDEWR°ÕOH

&RQGLWLRQDO 6WDQGDUG (UURU RI 0HDVXUHPHQW &KDUDFW

7KH UHODWLRQVKLS EHWZHHQ WKH VHQVRU DQG WKH &6(0 DXWKR
UDWLYH FDOH VFRUH WUDQVIRUPDWLRQ .ROHQ DQG %UHQQDQ
ZKHWKHU WKH &6(0 LV GHULYHG IURP WKH UDZ VSHFWUXP
&6(0V IRU UDZ VFRUHV DQG OLQHDU WUDQVIRUPDWLRQV
FKDUDFWHULVWLF SHUIRUPDQFH &6(0V DW WKH HQG
DQG ODUJHU &6(0V WRZDUGV WKH PLGGOH RI WKH GLVWULEX



'(&,6,21 &216,67(1&< $&&85$&< 67$7(0(17
,Q D VWDWHGDHUGVWHVWLQJ SURJUDP

		TEST ONE		
		LEVEL I	LEVEL II	MARGINAL
TEST TWO	LEVEL I	M_{11}	M_{12}	$M_{1\cdot}$
	LEVEL II	M_{21}	M_{22}	$M_{2\cdot}$
	MARGINAL	$M_{\cdot 1}$	$M_{\cdot 2}$	1

)LJXUH VHXGRFLVLRQ 7DEOH IRU 7ZR +\SRWKHWLFDO &DWHJRU

		TEST ONE				
		LEVEL I	LEVEL II	LEVEL III	LEVEL IV	MARGINAL
TEST TWO	LEVEL I	M_{11}	M_{12}	M_{13}	M_{14}	$M_{1\cdot}$
	LEVEL II	M_{21}	M_{22}	M_{23}	M_{24}	$M_{2\cdot}$
	LEVEL III					

7DEOH *URXS 0HDQV 5HJHQWV ([DPLQDWLRQ LQ *OREDO +L

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

7KH 5HJHQWV ([DPLQDWLRQ LQ *OREDO +LVWRU\ DQG DFKLHYHPHQW RQ WKH 1<6 3± &XUULFXOXP 6WDQGDUGV IRU *OREDO +LVWRU\ DQG *HRJUDSK\ VWDQGDUGV F
KWWS ZZZ S Q\VHG JRY FLDL VRFVW VVUJ KWPO

&RQWHQW 9DOLGLW\

&RQWHQW YDOLGLW\ LV QHFHVVDULO\ FRQFHUQHG ZLWK V HYLGHQFH WKDW WKH WHVW SURYLGHV DQ DFFXUDWH PHDV GHILQHG FRQVWUXFW EOXHSULQW IRU WKH 5HJHQWV ([DPL *HRJUDSK\ LV HVVHQWLDOO\ WKH GHVLJQ GRFXPHQW IRU FR GHILQLWLRQ RI WKH FRQWHQW GRPDLQ WKDW LV WR EH UHS SURFHVV GLVFXVVHG LQ WKH QH[W VHFWLRQ LV LQ SODFH EOXHSULQW LV PHW LQ DOO RSHUDWLRQDO DVVHVV WDFKG UG RQ WKH H[DP

7DEOH7HVW %OXHSULQW 5HJHQWV ([DPLQDWLRQ LQ *OREDO

Item Type	Standards
Multiple-choice	

HW R U \
D W L Q J
S P H Q W
H G X F L
E \ D W \

7KH GLVWLQFW VWHSV WR VROYH DQ LQLWLDO FODVV DWWH
HOHPHQWV DQG EHJLQ EHIRUH WKH RSHUDWLRQDO WHVW LV
GXULQJ ZKLFK PDQ\ PRUH LWHPV WKDQ DSSHDU RQ WKH RS
UHSUHVHQWDWLYH VXEVHW RI DQFKRU´ SDSHUV UHSUHVHQW
DFURVV WKH UDQJH RI SRVVLEOH
REMHFWLYH RI MLQGLQJ UHVHDUFK LV WR FUHDWH D WUDLQL
H[HFXWLRQ VFWKHV IURP ZKLFK DUH XVHG WR JHQHUDWH LPSRU

7KH IROORZLQJ DQDO\VHV WZKHUH5HJRQDOXQLWDOOR+LVWR
DQG *HRJUDSK\

- LWHOL IILFXOW\
- LWHOL VFULPLQDWLRQ
- GLIIHUHQWLDWLQJ FOWLRQLQJ
- ,57PRGHOV
- WVWOLDELOLW\
- FODVVLILFDWLRQHQF\
- WVGLPHQVLRQDOLW\

,WHP 'LIILFXOW\

0XOWLSOH DQDO\VHV DOORZ DQ HYDOXDWLRQ GLIILFXOW\ LWHP OREHFDWLRQPSHXWHGP DWHV&5RUWWR
5HJHQWV ([DPL*QDWLRQ+LQGVRHUR JVRXS\D UDSQYLDOHFRQVLV
ZLWK WKH WDUJHWHGPDXGLHQFHWRPZLWK D PHDQ RI
OPs)qXU`WRRHUHWKRLEQLWHULDO YDOXHV GLVFXVVH0 ž a''ëÂ /C t• Ð ˜"0‡HRUL

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

Or0R a''ëÂ /7™"‡… "A•0 ÷#

E\ FRQWHQW VTSKHE\HDHLXQDEOH WR LGHQWLUHDVRQWMQZWHPV
PLJKW EH IXQFWLRQLQJ GLMWXHQQG EHWZHQG EHQRW \
DQ\ LVVXH ZLWK XVLQJ WKHP IRU WKH RSHUDWLRQDO H[DP

)XOOLHUHQWDFWLRQVQOWV DUH UHSRUWKHQVSRQGL[

,57 0RGHO)LW

&UR Q EDFK RQ WKH KRVW KDW QHJDWLYH FRQVHTXHQFHV
WHVW XVH)URP WKLV SHUVSHFWLYH WKH WHVW XVHU LV R
HQVXUH DSSURSULDWH DQG VXSSRUWHG XVHV 5HJDUGOH
FRQVHTXHQWLDO DQDO\VLV GDQW WR FDXWLRQ DJDLQVW XVHV W
YDOLGLW\ FODLPV GRFXPHQWHG IRU WKLVWWRHSVUWHG)LFWHQDPH
VFRUHRQ RWKHUV QRWWGLUHFWO\ VXSSRUWHG E\RHEL\WKHU W
GHYHORSPHQWDQGUHVHDUFK FRQGXFWHG$ERULHQDWLYH RIDZH
RI1HZ <RUN 6WDWH XQLYHUVLWLHEVHDQGHFRQSOHJFLWVWRQGWDWK
WHVWLQJ UHTXLUHPHQW WRZDUG JUDGXDWLRQ IRUOVRVEXGHQ
+LVWDRUG *HRJUDSKHDLVPRVW FRPPRQO\ XVHG WR LQIRUP DGP
SODFHPHQW GHFLVLRQVEHQ EH FRQVLGHUHGWRQGDEVHPWWKH
FRPSHWHQFLHV GHPRQVWUDWHG E\ 1DWLYH $PHULFDQ +LVWRU\ DUH FRQVLVWHQW ZLWK WKRVH UHTXLUHG LQ WKH FRXUVHQW
SODFHPHQW

5HIHUHQFHV

$PHULFDQ (GXFDWLRQDO 5HVHDUFK $VVRFLDWLRQ $PHUL
1DWLRQDO &RXQFLO RQ 0HDVXUHPHQW LQ (GXFDWLRQ
SV\FKRORJLFDO WHVWLQJ '& $PHULFDQ (GXFDWLRQDO 5H

%DUNDRKXDLOHG (IIHFWV RI PDUNLQJ PHWKRG DQG UDWHU H
VFRUHV DQG UDWHU $VVHVVRU (GXFDWLRQ 3UL

&RQJGRQ 3 - 0F4XHHQ 7KH VWDELOLW\ RI UDWHU DO
DVVHVVPHQW -RXUQDO RI (GXFDWLRQDO 0HDVXUHPHQW

&RRN ' $ %HFNPDQ 'RHV VFDOH OHQJWK PDWWHU" $ F
YHUVXV SRLQW UDWLQJ &(;DGHYDQFHV LQ +HDOWK 6FLHQFH

&URQEDFK / - &RHIILFLHQW DOSKD DQG WKH LQWHUQ

&URQEDFK / -)LYH 3HUVSHFWLYHV RQ YDOLGLW\ D
(GV 7HVW 9DOLGLW\ 1- /DZUHQFH (UOEDXP

&URQEDFK / - /LQQ 5 / %UHQQDQ 5 7 *HQHUDOL]DE
DQDO\VLV IRU HGXFDWLRQDO DVVHVVPHQWV /RV $QJHOHV &
6WXGHQW 7HVWLQJ 5HWULHYHG)HEUXDU\
ZZZ FVH XFOD HGX SURGXFWV HYDOXDWLRQ FUHVVWBHF

*RUPDQ & $ 5HQWVFK (YDOXDWLRQ UHOLDELOLW\
HIIHFWLYHQHVV XVLQJ SHUIRUPDQFH UDWHU

a''è$ Y Â!/O”b.)Ð 0

+DULN 3 &ODXVHU % (*UDERYVN\ , 1XQJHVWHU 5 -
6SULQJ H[DPLQDWLRQ RI UDWHU GULIW ZLWKLQ D JH
-RXUQDO RI (GXFDWLRQDO 0HDVXUHPH

+DUYLOO / 0 6WDQGDUG(GXFDWLRQDO0HDVXUHPHQW
3UDFWLFHV í

+RUQ- / $ UDWLRQDOH DQG WHVW IRU WKH DQDO\VHV
3V\FKRPHWULND

+R\W : 7 .HUQV 0D JQLWXGH DQG PRGHUDWRUV RI ELDV

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

Position	Item Type							

7DEOH7$HVW 0DS

Position	Item Type	Max Points	Weight	Standard	Mean	Point-Biserial	Rasch Difficulty	INFIT
47	29	1	1	2	0.73	0.46	-0.6276	0.95
48	30	1	1	2	0.53	0.51	0.5014	0.95
49	31	1	1	2	0.59	0.53	0.1628	0.91
50	32	1	1	2	0.45	0.56	0.8858	0.88
THM	THM	5	3	2, 3, 4	0.88	0.58	1.8347	1.02
1	1	1	1	5	0.73	0.41	-0.5867	1.02
2	2	1	1	3, 4, 5	0.80	0.52	-1.0359	0.85
3	3	1	1	2	0.77	0.43	-0.8084	0.97
4a	4a	1	1	2, 5	0.75	0.58	-0.6703	0.80
4b	4b	1	1	2, 5	0.44	0.50	0.9475	0.92
5a	5a	1	1	5	0.65	0.54	-0.0806	0.87
5b	5b	1	1	2, 5	0.58	0.56	0.2511	0.85
6	6	1	1	5	0.73	0.46	-0.5594	0.95
7	7	1	1	3, 5	0.34	0.46	1.4543	0.94
8	8	1	1	2, 4, 5	0.58	0.48	0.2622	0.95
9	9	2	1	2, 4, 5	1.34	0.59	0.0174	1.02
DBQ	DBQ	5	3	2, 3, 4, 5	1.06	0.58	1.5801	1.09

$SSHQGL[% 7KH :DVDR H 6FRUH &RQYHU 7DEOHV

7DEOH69%RUH 7DEOH IRU $SULO 2QVWUDWLRQ

Raw Score	Ability	Scale Score
0	-5.7700	0.667
1	-4.5530	1.366
2	-3.8412	2.044
3	-3.4169	2.724
4	-3.1103	3.490
5	-2.8682	4.357
6	-2.6669	5.158
7	-2.4935	6.029
8	-2.3407	6.924
9	-2.2035	7.820
10	-2.0786	8.799
11	-1.9637	9.809
12	-1.8569	10.817
13	-1.7570	11.836
14	-1.6629	12.939
15	-1.5738	14.066

7DEOH6%RUH 7DEOH IRU -DQXDU\

&+(&./,67 27)(67 &216758&7,21 35,1&,3/(6
0XOW&LKSROLHF H ,WHPV

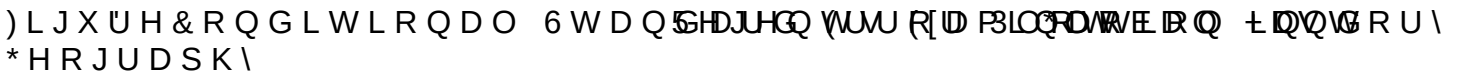
3UHSDUHG IRU 1<6(' E\ 3HDUVRQ

)LJXUH6FUHH 3OHQWV ([DPLQDWLRQ LQ

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

7 D E O H 6 X P P D U \ , 1 R) I , 7 0 H D Q 6 T X D U H 6 W H D J W H L Q W W L F [M D P L Q O R E R Q L Q
+ L V W R Q G * H R J U D S K \

INFIT Mean Square		
N	Mean	SD



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

7DEOH*URXS 0HDQVHQWV ([DPLQDWLRQ ±DVW*UHVRJUDSK\

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

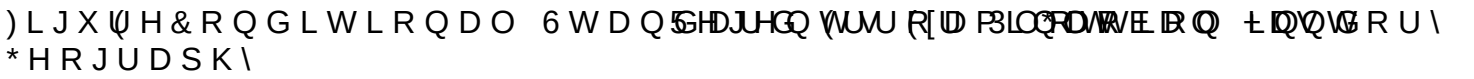
7 D E O H & R Q V W U X F W H G Q V H , W H P $ Q D O \ V L V 6 X P P D U L D W L R Q
* O R E D O + D Q G R U H \ J U D S K \

Item	Min. score	Max. score	Number of Students	Mean	SD	p-Value	Point-Biserial
51	0	5	46,187	1.54	0.95	0.31	0.65
52	0	1	46,187	0.92	0.28	0.92	0.24
53	0	1					

7DEOH'HVFULSWLYH 6WDWLVWLFVRI%LVHULDO &RUUHODWLRQ 5
([DPLQDWLRQEDOO +DQGR*UH\RJUDSK\

Statistics	N	Mean	Min	Q1	Median	Q3	Max
p-value	63	0.56	0.22	0.42	0.51	0.63	0.97
Point-Biserial	63	0.27	0.11	0.22	0.26	0.30	0.65

)LJXUH6WXGHQW 3HUIRUPDQFH9DULDWLRQ%HWZHHQ +DQGRU\ *HRJUDSK\



)LJXUH&RQGLWLRQDO 6WDQGDUGL]HG[UHVLGXDO3ORWRIWKH+DQQDQ*RU*HRJUDSK\

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

7DEOH*URXS 0HDQJHQWV ([DPLQDWLRQ +DQGRXW\RJUDSK\