



- RXUQDO RI & KLOG
% HKDYL RU

\$ GROHVFHQW

ZODURWLPL - &KLOG \$GROHVF
'2,

5HVHDUFK \$UWLFOH

2SHQ \$F

5IF 4XBZ PG (FOEFS BOE "OYJFUZ PO 1FSDFQU

5DML 6DNLUX 2ODURWLPL

'HSDUWPHQW RI +RXFGLRORJ\ 1RUWK \$PHULFDQ 8QLYHUVLW\ %HQLQ 5HSXEOLF %HQLQ
&RUUHVSRQGLQ5DILWLKORNULUX 2ODURWLPL 'HSDUWPHQW RI 6RFLRORJ\ +RXGHJEH 1RUWK \$PHULFDQ 8QL
ZDOHUDMHH#JP DLO FRP

5 H F H L Y H G G D W H - \$ X P O F \ H S W H G G D W H \$ X J X V W \$ X J X V W \ D L V K H G G D W H

&RS\ULJKW < 2ODURWLPL 56 7KLV LV DQ RSHQ DFFHVV DUWLFOH GLVWULEXWHG XQGHU WKH WHUPV
XVH GLVWULEXWLRQ DQG UHSURGXFWLRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO DXWKRU DQG VRXL

\$EVWUDFW

7KHWXG\ LQYHVLJDWHG DQ[LHW\ DQG JHQGHU DV FRUUHODWHV RI XQGHUJUDGVWXG\ DLPHG DW H[DPLQLQJ WKH UHODWLRQVKLS EHWZHHQ DQ[LHW\ DQG XQGHUJDOVР DVVHVVG JHQGHU @À«L SHUÀP0pÀ ORI VSDÀP 07KHDLPA P ?0JHQGHMð` 0DQG WKH FROOHFWLRQ RI GDWD 7KHVH VDPSOLQJ WHFKQLTXHV LQFOXGH WKHUDQGRP VDPSOLQJ \$ WRWDO RI UHVSRRQGHQWV ZHUH XVHG IRU WKLV UHVHDUYDULRXV IDFXOWLHV DQG GHSDUWPHQWV RI IXOO WLPH XQGHUJUDGXDWV VWXG\ TXHVWLQQDLUH ZDV XVHG WR PHDVXUH UHVSRRQGHQW\ V OHYHO RI DQ[LHW\ DQG S

7ZR K\SRWKHVHV ZHUh WHVWHG DW OHYHO RI VLJQLILFDQFH XVLQJ 7 WHVW
FRHIILFLHQW 7KH UHVXOW RI WKH ILUVW K\SRWKHVVL VKRZV D VLJQLILFDQW UHC
SHUFHSWLRQ RI SHUFRQDOWHESDFH 30 @ 7KH UHVXOW RI WKH VHFRQG K\SRWK
WKDW WKHUH LV D VLJQLILFDQW JHQGHU GLIIHUHQFH LQ FRQGHUJU GXDWHV SH
WDE 30 @ :KLOH PDOH Q KDYH D PHDQ VFRUH RI DQG D VWDQGDU
HUp`0 p°EQ RLV Q ÅVS S'4•u . 6qX%oWÅt @T- #fG6i #fG @Racj
SHUFHSW HPI SHUVRQD@Pp€FH >W

Q[LHW\ *HQGHU 3HUFHSWLRQ DBWHU VORLQDHO \V\W\BFJURZ HYHU PRUH FURZGHC
> @YHQ SXW QXPEHUV WR @W\HQ\W\Q\N SLRQNYHLQ
%DFNJURXQG WR WKH 6WXG\]RQHV DURXQG XV DQG DWWULEXWHG D U

L Q W L P D W H G L V W D Q F H W R L Q F K H V S
3 H U V R Q D O V S D F H U H I H U V W R D S H U V R Q H W S H U V F H D Y O H G L V W D Q F H F E R X Q V B R U L H H W W
E R X Q G D U L H V D U H L Q Y L V L E O H D Q G H Q F P R U H D % S D V F H S A V V R Q D O V V E S H D F H Q I Q L V N H Q R H M G
D E X E E O H \$ F F R U G L Q J W R > @ H D F K L Q S G U H I H U G P O H N V E P O H X D Q W X V U S H D F M R L P X D Q W X D U S H S U B
S H R S O H V K R X O G Q R W S K \ V L F D O O \ Y I S R A D M F D Q V Q R R Q T H X H U R U V W R K H R V K M R Z L I O G O I
F R P I R U W D E O H H D Q P G R X Q F X R H S H U V R Q D O S I S D V R I Q D H T X V S D F H I R V U K D Q \ S H R S O H L Q O H G I
J F X O W X U H V D Q G P R U H W K D Q P H Q L Q \$ U D E

SHRSOHQZKRVSDFH UHTXLUHPHQWV LQ H[FKDQJ
YHUVLRQDWHQWV DQG DQG DQG DQG DQG DQG DQG

UHDVRQ WR TXHOO RQHdV QHHG
UHODWLRQVKLSV ,Q WKHVH FDVHV
H[SHFWHG DV ZHOO DV GHVLURHVGHZQH
K

K
LYHQ SHUVRQ LV VXEMHFWLYH)RU H[DPSOH RQH ZKR LV DFFXVWRPHG WR EXVI
FLW\ OLIH HVSHFLDOO\ ULGLQJ RQ FURZGHG VXEZD\V LV PRUH WROHUDQW RI
RWKHUV LPSHGLQJ RQ WKHLU SHUVRQDO VSDFH WKDQ VRPHRQH ZKR PD\ OLYH
LQ D PRUH UXUDO DUHD ,Q IDFV RQH ZKR LV XVHG WR KDYLQJ WKHLU SHUVRQD
VSDFH UHVSHFWHG PD\ EHFRPH H[WUHPHO\ DQ[LRXV DQG FODXVWURSKRELF
ZKHQ SODFHG LQ D VLWXDWLRQ ZKHUH SHUVRQDO VSDFH LV D OX\XU\

\$FFRUGLQJ WR VFLHQWLWV SHUVRQDO VSDFH LQYROYHV QRW RQO\ WKH LQYLVLEOH EXEEOH DURXQG WKH ERG\ EXW DOO WKH VHQVHV 3HRSOH PD\ IHH WKHLU VSDFH LV EHLQJ YLRODWHG ZKHQ WKH\ H[SHULHQFH DQ XQZHOFRPH VRXQG VFHQW RU VWDUH WKH ZRPDQ RQ WKH EXV VTXDZNLQJ LQWR KHU FHOOSKRQH WKH FR ZRUNHU LQ WKH DGMDFXHQW DQXSEFLVQRHG GFDKEDEQJHU IRQ FARKHRUVJLGRVWUWKH PDQ LQ WKH VDQGZLFK VKRS OHHDQGLQH UDVR QB\ R\ VHWEDKOLWR QDQWDLQWK OHXWHOWKZKHWKHU SHRSOH KDYH EHFRPH PRUH SWURWWH\ LGYH RW RW KWKLU SSKHUV\ VRQDOQ\ Q\GDFFPR GLyF\XW\RWV D\ 6WXGLHV VKRZ SHRSOH WHQGFWRF DQD\ BMMV H\YH\QW\ LQ KFH\W\YH\XH ZKIL\RM

ZRUNV ERWK ZD\V ZKLFK LV ZK\ H[SHUWV EHOLHYH WKDW LQWLPDF\ LQ
UHODWLRQVKLSV KHOSV WKHP WR JURZ VWURQJHU RYHU WLPH

5HVHDUFK 'HVLJQ

H VWXG\ HPSOR\V D GHVFULSWLYH VXUYH\ UHVHDUFK GHVLJQ WR
GHWHUPLQH WKH UHODWLRQVKLS EHWZHHQ WKH LQGHSHQGHQW DQG GHSHQGHQ
YDULDE\ QBMHFVLYH RI WKH VWXG\ GHVLJQ LV WR SURYLGH D TXDQWLWDWLYH
RU QXPHULF GHVFULSWLRQ RI VRPH IUDFWLRQV RI WKH SRSXODWLRQ WKH
VDPSON E\ DVNLQQ UHOHYDQW TXHVVWLRQV WKDW DGGUHVV VRPH XQNQRZQ
DVSHFW RI WKH SRSXODWLRQ

6WXG\ SRSXODWLRQ

H SRSXODWLRQ IURP ZKLFK WKLV VWXG\ ZDV FDUULHG RXW FRQVLVWV RI
IXOO WLPH XQGHUJUDGXDWH VWXGHHQWV RI WKH 8QLYHUVLW\ RI /DJRV
8QLYHUVLW\ RI /DJRV SRSXODUO\ NQRZQ DV 8QLODJ LV D IHGHUDO XQLYHUVLW\
ZLWK D PDLQ FDPSXV ORFDWHG DW \$NRND <DED DQG D FROOHJH RI PHGLFLQH
ORFDWHG DW ,GL \$UDED DOO LQ /DJRV /DJRV VWDWH VRXWKHUQ 1LJHULD
XQLYHUVLW\ KDV IXOO WLPH XQGHUJUDGXDWH VWXGHQW VWUHQJWK RI RYHU
LQGLYLLY

7DEOH 6KRZLQJ FRUUHODWLRQ DQDOWXEWHRFVUHHG DWRLRERKHYSLQHOMZUHHC DDUOLRW
DQG XQGHUJUDGXDWHD SHUFHSWLQRQWRH SKURVRQDRI WSKDFUHVXROWWHVW WKH
K\SRWKHVLV GDWD FROOHFWHG RQ DQ[LHW\ DQG SHUVRQDO VSDFH ZHUH

9DULDEOH	1	0HDQ	6'	'I	U FDO	U WDE	3 YDO
\$Q[LHW\							"
3HUVRQDO VSDFH							!

7DEOH

LQFOXGH ERWK SK\VLFDOLWDQG BMFDFKRVHDLFLDOHV\VSDFH
PRUH ZLOOLQJ WR JLYH XS KLV SHUVRQDO VSDFH WR D IHPDOH WKDQ WR DQRWK
PDOH %\ LPSOLFDWLRQ PDOHV KDYH D KLJK SHUFHSQLRQ RI SHUVRQDO VSDFH
WKDQ IHPDOHV ZKR FDQ JLYH XS WKHLU SHUVRQDO VSDFH WR DQ\ PDOH WKH%\
KDYH D FORVH UHODWLRQVKLS ZLWK DQG DOVR WR RWKHU IHPDOHV

6XPPDU\ RI WKH 6WXG\

LV VWXG\ LQYHVLJDWHG DQ[LHW\ DQG JHQGHU DV FRUUHODWHV RI
XQGHUJUDGXDWHD SHUFHVSWLQRQ\ RD\\$HSUVRQHDQWV\ SDFH
LQYHFKDSWHW\ QWURGXFWRU\ FKDSWHU FKDSWHU RQH SUHVHQWV
EDFNJURXQG WR WKH VWXG\ WKH VWDWHPHQW RI SUREOHP REMHFWLYHV DQG
VLJQL\} RDQF\KH H\W\NGLHZ RI HPSLULFDO OLHUDWXUH LQ FKDSWHU
WZR FRYHUV FRQFHGSWV RI SHUVRQDO VSDFH DQ[LHW\ DQG JHQGHU DV ZHOO D
WKHRUHWLFDO IUDPHZRUN DQG UHYZLHZ RI HPSLULFDO VWXGLHV

4 X D Q W L W D W L Y H G D W D Z H U H D Q D O \ J H G X V L Q J 7 W H V W 3 H D U V R Q F R U U H O D W L R C
F R H y F L H H Q R M X U W K F K D S W H U S U H V H Q W V W K H D Q D O \ V L V U H V X O W R I G D W D Z K L O H
G L V F X V V L R Q D Q G V X P P D U \ F R Q F O X V L R Q D Q G U H F R P P H Q G D W L R Q Z H U H W K H
I R F X V R I } F Y K H D S W E B K \ S R W K H V H V Z H U H W H V W H G D W O H Y H O R I
V L J Q L \ F H D Q F H V X O W V V K R Z H G W K D W

H U H V V D J Q L } B B Q W W L R Q V K L S E H W Z H H Q D Q [L H W \ D Q G S H U V R Q D O
V S D F H S H U F H S W L R Q D P R Q J X Q G H U J U D G X D W H V

H U H V V D J Q L } J H D Q Q M H W H U H Q F S H U F H S W L R Q R I S H U V R Q D O
V S D F H D P R Q J X Q G H U J U D G X D W H V

& RQFOXVLRQ

H LQWHJULW\ RI SHUVRQDO VSDFH DQG SULYDF\ LV SURWHFWHG E\ WHUULWRULDOLW\ 1R ZRQGHUV XQGHUJUDGXDW HV GHPDUFDW H WKHLU VSDFHV WKHLU UHVSHFWLYH ~~OKLDVHQHNRQWVHV~~ VRUGHXQFVM DZLQWKD QG