

# 6DIH \$IWHUFDUH RI )RRW DQG \$QNOH 6XUJHU 'UHVVLQJ & DVW

7RQLR \*RWWOLHE

&RUUHVSRQGV 7RQLR \*RWWOLHE 'HU )XVFKLUXUJ 7HOWRZHU 'DPP %HUOLQ \*HUPDQ\ 7H  
7RQLR \*RWWOLHE #JP[ QHW

5HFHLYHG-GDWH \$FFHSWHG GDWH \$EOLVKHG GDWH 6HS

&RSULJKW ( \*RWWOLHE 7 HW DO 7KLV LV DQ RSHQ DFFHVV DUWLFOH GLVWULEXWHG XQGHU WKH W  
XVH GLVWULEXWLRQ DQG UHSURGXFWRQ LQ DQ\ PHGLXP SURYLGHG WKH RULJLQDO DXWKRU DQG VRXU

## \$EVWUDFW

\$IWHUFDUH UHVVLQJ SURFHGXUH LV QRW FRQVHGXDO LQ WKH FRPPXQLW\ RI IR  
LQFLGHQFH RI LQIHFWLRQV IROORZLQJ IRRW DQG DQNOH VXUJHU\ LV UDUH VRI  
H[WHQVLYH DQG PXOWLSOH DSSURDFKHV )UHTXHQW IROORZ XS ZLWK YLVXDO FR  
WKRXJKW WR EH WKH RSWLPDO ZRXQG FDUH DSSURDFK

7KH FOLQLFDO UHVHDFK DERXW WKH MRQHV GUHVVLQJ FDUH VKRZHG OHVV IUH  
RQ WKH ZRXQG UHGXFHV WKH QHHG RI DQDOJHWLFV WKH KRVLWDOLVDWLRQ WL  
DYRLG FRPSOLDWLRQV

.HIZRUGRRWUJHU\ &DVW &RPSOLDWLRQV WKRXJKW ERORJLQRFD(GHPD DQG ,G  
3RVW RSHUDWLYH

## ,QWURGXFWRQ

7KH PDQDJPHQW RI SRVWRSHUDWLYH SHULRGV LV WDLQJ > @ D NH\VRQH  
LQ HOHFWLYH IRRW DQG DQNOH VXUJHU\ 7KH VPDOO DUWHULHV XQGHUJR YDVRGL

'XH WR LWV ORFDOL]DWLRQ SRVWRSHUDWLYH SHULRGV LV WDLQJ > @ D NH\VRQH  
DQG DQNOH VXUJHU\ 6RIW WLVVXH WKRXJKW ERORJLQRFD(GHPD DQG ,G  
LPPRELOL]DWLRQ GXH WR SDLQ UHVWULFWRQ WXUQ DXJPHQWV WR D OH

7KH LQFLGHQFH IRU LQIHFWLRQ LQ HOHFWLYH IRRW VXUJHU\ LV UDUH VRI  
'HSHQGLQJ RQ WKH ULVN IDFWRUV DQG WKRXJKW ERORJLQRFD(GHPD DQG ,G  
EH DV KLJK DV > @ OLOOHU HW DO > @ VKRZHG WLDW WKHU LV D KLJKHU  
UDWH RI ZRXQG FRPSOLDWLRQV LQ IRRW DQG DQNOH VXUJHU\ WKRXJKW ERORJLQRFD(GHPD DQG ,G  
RUWKRSHGLF ILHOGV 7KLV VHHPHG WR EH WKRXJKW ERORJLQRFD(GHPD DQG ,G  
DQG D KLJKHU GHJUHH RI EDFWHULDO SHULRGV LV WDLQJ > @ D NH\VRQH  
WKH ERG\

7KH SRWHQWLDO ULVN IDFWRUV VKRXJKW ERORJLQRFD(GHPD DQG ,G  
'XULQJ WKH SURFHGXUH VRIW WLVVXH WKRXJKW ERORJLQRFD(GHPD DQG ,G  
SUHVHUYH WKH ORFDO YLWDOLW\ RI ELRORJLQRFD(GHPD DQG ,G  
WLVVXHV EHIRUH DQG DIWHU WKH VXUJHU\ WKRXJKW ERORJLQRFD(GHPD DQG ,G  
PRVW VLJQLILFDQW IDFWRU LQ WKH GNYHRSRQDQXV\ VNLQFWLQJLQYDQX HW DRU  
RSHQ UHGXFWRQ DQG LQWHUQDO ILQWURQV WKRXJKW ERORJLQRFD(GHPD DQG ,G  
GDPDJH WR WKH VRIW WLVVXH HQYHORSH :RXQG KHDOLQJ SUREOHPV DUH  
XVXDOO\ DVVRFLDWHG ZLWK XQFRRUGLQDWHG VXUJLFDQXV\ WKRXJKW ERORJLQRFD(GHPD DQG ,G  
XQIDYRUDEOH VRIW WLVVXH HQYLURQPHQW > @ HGHPD > @

3RVWRSHUDWLYH HGHPD LV D FRPPRQ VHTXHOD WKDQW FRQWULEXWHV WR  
XQIDYRUDEOH FRQGLWLRQV IRU ZRXQG KHDOLQJ 3URORQJHG HGHPD UHVWULFW  
PRWLRQ LQ WKH H[WUHPLW\ HVSHFLDOO\ LQ VPDOO MRLQWV ,W DOVR FRPSURPLV  
SHUHVLRQ RI WKH VRIW WLVVXH DQG LQFUHDVHV WKH ULVN RI EUHDNGRZQ RI V  
RSHUDWLYH ZRXQG > @ (GHPD LV PRUH OLNHO\ WR RFFXU LQ WKH ORZHU UDWKH  
WKDQ WKH XSSHU OLPEV GXH WR WKH PRUH GLILFXOW YHQRXV UHWXUQ

'XULQJ WKH SRVWRSHUDWLYH SHULRG VSHFLDO GUHVVLQJLV DQG  
LPPRELOL]DWLRQ WHFKQLTXHV PD\ OLPLW VRIW WLVVXH HGHPD DQG VZHOOHQJ

5HJDUGLQJ WKH DERYH PHQWLRQHG PHFKDQLVPV WKH VXUJHRQ KDV WKH  
IROORZLQJ SRVVLELOLWLHV WR KHOS PLQLPL]H HGHPD DQG LWV UHODWHG  
FRPSOLFDWLRQV

6HOHFW WKH DSSURSULDWH RSHUDWLRQ IRU WKH SDWLHQW 7DNH LQWR DFFR  
WKH DJH JHQHUDO KHDOWK RI WKH SDWLHQW DQG WKH OLPE LQYROYHG > @

3HUIRUP JHQWOH DQDWRPLF GLVVHFWLRQ DYRLG H[WHQVLYH GLVVHFWLRQ  
RU WUDXPD

,PPRELOL]H DQG JHQWO\ HOHYDWH WKH OLPE WR UHGXFH WKH LQWUDYDVFXOD  
SUHVXUH

\$SSO\ FRPSUHVVLQRQ GUHVVLQJV WR UDLVH WKH LQWHUVWLWLDO SUHVXUH  
/LPLW ZRXQG FRQWDPLQDWLRQ GXULQJ WKH KHDOLQJ SHULRG  
&U\RWKHU\

/LPLW WKH KLVWDPLQLF UHDFWLRQ XVLQJ VKRUW DFWLQJ FRUWLFVWHURLG

+RZHYHU WKH SODQQLQJ DQG GHFLVLRQV PDGH EHIRUH VXUJHU\ DV ZHOO DV  
WKH VXUJLFDO VXFFHVV GHSHQGV RQ WKH VNLOO DQG WKH SHUVRQDO H[SHULHQF  
WKH VXUJHRQ ,W VKRXOG EH UHDOL]HG WKDW DOO GDPDJHG VWUXFWXUHV PXV  
KHDO 7KH JUHDWHU WKH DPRXQW RI GDPDJHG WLVVXH WKH PRUH OLNHO\ LV WK  
SRVVLELOLW\ IRU FRPSOLFDWLRQV VXFK DV LQIHFWLRQ KHPDWRPD DQG  
H[FHVVLVLYH VFDU IRUPDWLRQ (VVHQWLDO VWUXFWXUHV VXFK DV QHUYHV DQG  
YHVVHOV VKRXOG EH KDQGOHG ZLWK PHLFXORXV FDUH DQG SUHVHUYHG  
'HOLEHUDWH VKDUS GLVVHFWLRQ ZLOO PLQLPL]H JUHDWHU WLVVXH GDPDJH ZKLF  
PD\ RIWHQ EH VHHQ ZLWK EOXQW GLVVHFWLRQ DQG WKH XVH RI VFLVVRUV

6\VVHPLF DSSOLHG FRUWLFRLGV FDQ KDYL VLJQLILFDQW VLGH HIIHFWV H J

7KH -RQHV GUHVVLQJ FDVW LV DSSOLHG VWHULOH LPPHGLDWHO\ SRVW  
RSHUDWLRQ LQ DQ HQFLUFOLQJ PDQQHU QR VOLW DQG LW LV UHFRPPHQGHG WK  
LW UHPDLQV LQ SODFH IRU WZR ZHHN 7KHUH LV QR YLVXDO FRQWURO RU IROO  
XS LQ WKLV SHULRG

,Q WKLV VWXG\ SDWLHQWV ZHUH GLYLGHG LQ WZR JURXS ,Q JURXS WKH  
ZRXQG GUHVVLQJ ZDV FKDQJHG IUHTXHQWO\ HYHU\ VHFRQG GD\ DIWHU  
FRPSOH[ VXUJHU\ RI WKH IRRW ZLWK QR YLVXDO FRQWURO 3DWLHQWV LQ JURXS  
ZHUH WUHDWHG ZLWK D MRQHV GUHVVLQJ FDVW IRU ZHHN

3DWLHQWV LQ WKH FDVW JURXS ZHUH PRELOH XVLQJ FUXWFKHV DQG XVLQJ  
VWDLUV RQH GD\ HDUOLHU WKDQ SDWLHQWV RI JURXS

7KH SDWLHQWV WUHDWHG ZLWK WKH FDVW VSHQW D PHDQ RI GD\ LQ  
KRVSLWDO FRPSDUHG WR GD\ LQ WKH QRQFDVW JURXS S

3DWLHQWV LQ WKH FDVW JURXS ZHUH IUHH RI DQDOJHVLV GD\ HDUOLHU  
WKDQ WKH SDWLHQWV LQ JURXS DV GHPRQVWUDWHG LQ ILJXUH S

,W ZDV DVVXPHG WKDW UHGXFHG VWUDLQ WR WKH VRIW WLVVXH FRYHU GXH WR  
FDVW PLJKW UHGXFH WKH FRPSOLFDFWLRQV LQ WKH SRVW RSHUDWLYH SHULRG 7  
-RQHV GUHVVLQJ FDVW SURYLGHV D OD\HU RI KLJKHU WHQVLOH VWUHQJWK WKDW  
WR SURWHFW WKH VNLQ > @

,Q WKLV VWXG\ WKH MRQHV GUHVVLQJ FDVW IDFLOLWDWHG GHDPEXODWLRQ ,

&LWDWLRQWOLHE 7 6DIH \$IWHUFDUH RI )RRW DQG \$QNOH 6XUJHU\ 'RLQJ OHVV LV PRU  
GRL ;

3DJH RI

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\*HUDUG 9 <X (ULF . 6FKXEHUW :LVVDP ( \*KXWOLHE 7 7KH -RQHV GUHV  
&RPSUHVVLQR %DQGDJH 5HYLHZ DQG &OLQLRQV \$SGLDQWRQWXURHUQDS \$RGRWKLFDWLRQ  
\$PHULFDQ 3RGLDWULF OHGLFDO \$VVRFLDWLRQRW \$QNOH 6XUJ  
6PLOGH 7UHDWPHQW \$IWRUSOLHWRQV DWGLVWVLFV FOLQLFD OXJDQHVH VHGL  
/HVLQRV RI WKH OHQLVFL ,Q ,QMXULHV RI WKH 6ZLWV-RS-Q\$QQXVIO (6WDWKXWFLFVQI 6ZLV  
/LYLQJVVRQH 1HZ <RUN

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&OLQ 5HV )RRW \$QNOH  
,661 ; &5)\$ DQ RSHQ DFFHVV MRXUQDO

9ROXPB k ,VVXH k