

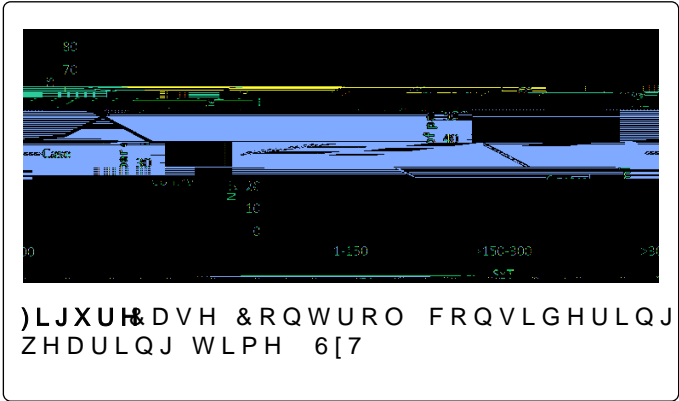
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E\ WKH 6HUylFH 6HYHUDO FRYDULDWHE UHFQWL GHDFH G L D V G S F M H Q G W D D V O Y F R Q L B X Q B
VXFK DV DJH DW PHQDUFKH SDULW\ EUDH Z V W U H L Q G L Q U P P I Q B S D L S O H L G J H V W H E
PHQRSDXVH XVH RI KRUPRQH UHSODF E A B Q W Q W W H L P D I S L Q E G H S H Q I G I H Q W D P D O L D E O H Y
KLVWRU\ RI EUHDVW FDQFHU DOFRKROG H R R J X I P S K M L F R Q E H I Q G Y V R X W D Q J D Q G V F D O Q R F
HYDOXDWHG

H SDUWLFSDQWVVZSHUFHQW R N F R O M L I R R O V V V R F L D W L R Q V S ZLWK WKH RFFXU
ZHDULQJ X K D E D W W K H D J H W K H \ E H J D Q W R Z H D U E U D V W K H W \ S H R I E U D
ZRUG WKURXJKRXW OLIH DQG LI V K H U Z R U H D E U D Z K H Q V O H H S L Q J
FROOHFWLQJ WKH GDWD WKH EUDdV IHDWXUHV VXFK DV WKH SUHVHQFH DEVHQF
PHWDO XQGHUZLUH DQG WKH W \ S H R I I D E U L F Z H U H H Y D O X D W H G

1H[W WKH EUD EDQG ZDV PHDVXUHG FHQWLPHWUHV ZLWK D PHDVXULQJ
WDSHSDUW RI WKH EUD ZDV PHDVXUHG EHFDXVH LW LV WKH SDUW WKDW KROG
WKH EUD WR WKH ERG\ DQG FDUULHV PRVW RI WKH ZHLJKW RI WKH EUHDVWV >
' H PHDVXUHPHQW RI WKH EDQG EUD VWUHWFKLQHV ZDV REWDLQHG DV IROORZV
WKH EUD GLDPHWHU '%' ZDV PHDVXUHG ZKHQ WKH SDWLHQW ZDV QRW ZHDULQJ
WKH JDUPHQW DQG ZLWKRXW VWUHWFKLQJ LWV ORZHU HGJH 1H[W WKH SDWLHQ
FKHVW GLDPHWHU &' Z D V H A H D K N L E D Q G V E U D K H O L Q H

H GLVHUHRCFVHDLQHG ZDV WKHQ GLYLGHG E\ WKH EDQG EUD
PHDVXUHPHQW ZLWKRXW DQ\ VWUHWFKLQJ DQG PXOWLSOLHG E\ WR REWDLQ
WKH VWUHWFK SHUFHQWDJH RI WKH EUD)RU H[DPSOH LI D EUD PHDVXUHG FP
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WKH EUD VWUHWFKHSDWLHQW 1H[W WKH IROORZLQJ FDOFXODWLRQ
ZDV SHUIRUPHG [ZKLFK UHSUHVHQWHG WKH VWUHWFK
SHUFHQWDJH ZKLFK LQ W K W L V P H I R P S E U D X D M L Q
KRXUVZDV REWDLQHG E\ DVNLQJ WKH SDWLHQW KRZ PDQ\ KRXUV SHU GD\
DQG KRZ PDQ\ GD\V SHU ZHHN VKH ZRUH D EUD D GDLO\ PHDQ EUD ZHDULQJ
WLPH ZDV W K X V I R O O R Z L Q J G I R U P X O D Z D V X V H G W R F D O F X O D W H
WKH EUD VWUHWFK SHUFHQWDJH B X O W L S O L H G E \ W K H Z H D U L Q J W L P H
6[7 &' %M '%' ;

H GLDPHWHU RI WKH EUD H D Q G U Z D W F S L Q H G M G L Q K D O I
7LPH 6[7 DQG 7LPH G L O W R Z H U V G L Y L G H G L Q W R S D U W
,PSRUWDQWO\ WR REVHUYH WKDW UZDOLVHG LQ WKH EUHDVH 6[7 RU
QXPEHU RI SDWLHQWV ZLWK EUHDVW FDQFHU DQG GHFUHDVHG WKH QXPEHU RI
SDWLHQWV ZLWKRXW EUHDVW H E O R Q F I G L O Q G Y L F H Y H U V D
WUDQVLWLRQ DUHD ZKHUH WKH GDWD WKDW ZDV FURVVHG ';7)LJXUH
DQG)LJXUH



)LJXUHdVH &RQWURO FRQVLGHULQJ EUD VWUHWFK SHUFHQWDJH ; EUD
ZHDULQJ WLPH 6[7

6WDWL VWLFD OHWKRGV

'DWD ZHUH FRPSLOHG DQG DQDO\VHG XVLQJ WKH SURJUDP 6\$6 YHUVLRQ
1& 86\$ 0XOWLYDULDWH DQDO\VLV ZDV FRQGXFWHG XVLQJ D 3RLVVRQ
UHJUHVLRQ ZLWK UREXV W H P X O W L D Q F H L D W R H I R Q G H O V
ZHUH XVHG VHSUDUDWHO\ RQH IRU HDFK LQGHSHQGHHQ YDULDEOH RI LQWHUHV

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%UD 'LDPHWHU

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%UD ZHDULQJ WLPH
+RXUV

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9DOXHV LQ IUHTSXNDORU E\ FKL VTXDUH WHVW

D EUD IRU D ORQJHU SHULRG RI WLPH-DORQHHRMH UZ RLPVH CZ DXW XDRDWH GG RV KDRW Z EID VHE
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ZLWKRXPVHDKW 2QH SRVVLEOH LQWHGSHVHVDMILQWIKLW SRK SXODWLRQ 5HJDUGL
DVRFLDWLRQ LI LW LV UHDO LV WKD Q RWHHG FRQVWU LFDWLRQ WDX ZH G KE \ EDU MDLV WV
D ORQJ SHULRG RI WLPH FRQWULEXWH FRPSDUXHG GZLVMDRVRKHQWRFGWHRUHQEWHKDRAM
DGGLWLRQ WR REHVLW\ LWVHOI > @ , QLFHQYFDEVMH -DSIDQDWR ZRPHQJYK E QVQDYW
LQ WKHLU FRXQWU\ KDG D VPDOO LQFLGH FRQRLGELHHDG V F B Q V W W LFRPISQJ H G HZLWQ
:HVWHUQ ZRPHQ ZKLFK LV DWWULEXVEHGDWR R MDKQELHU G LQHWKH SQ H K R Q W Y H W X G \

3UHYDOHQFH 5DWLR & ,

3UHYDOHQFH & , &UXGH S YDOXH \$@MXVWHG S YDOXH

7LPH

FRWWRQ EUDV GDWD QRW VKRZQ)XWXUH VWXGLHV VKRXOG EH SHUIRUPHG LQ
ODERUDWRULHV WR HYDOXDWH WKH OHYHO RI SUHVXUH WKDW HDFK W\SH RI
PDWHULDO H[HUVV RQ WKH EUHDV)XUWKHUPRUH WKHUH DUH QRW PDQ\ VWXG
DERXW EUD XVH DQG EUHDV FDQFHU ULVN DQG WKXV DGGLWLRQDO ODUJHU D
ZHOO GHVLJQH VWXGLHV DUH QHHGHG

,Q FRQFOXVLRQ WKLV VWXG\ GHPRQVUDWHG WKH H[LVWHQFH RI D
UHODWLRQVKLS EHWZHHQ WKH XVH RI D WLJKW EUD ZKHQ DVVRFLDWHG ZLWK D
LQFUHDVHG QXPEHU RI KRUV ZHDULQJ LW DQG WKH ULVN RI EUHDV FDQFHU
DPRQJ SUH DQG SRVW RHWK\RXV DZRRHQHUYHG
HYDROKOWLYDULDWH DQDO\VLV ZDV SHUIRUPHG ZLWK FRQIRXQG IDFWRUV
,Q DGGLWLRQ WKH VWXG\ UHYHDOHG QHZ GDWD WKDW PD\ KHOS WR EHWWHU
HOXFLGDWH WKH ULVN IDFWRUV IRU EUHDV FDQFHU DQG WR SUHYHQW WKLV GL
ZKLFK KDV LQFUHDVLRQ LQFLGHQFH LQ GHYHORSRQJ FRXQWULHV > @ DQG LV
RQH RI WKH ELJJHVW NLOOHUV RI ZRPHQ ZRUOGZLGH > @

\$XWKRUVD & RQWULEXWLRQV

3URIHVVURU 6DOHWH 6 5LRV PDGH VXEVWDQWLDO FRQWULEXWLRQV WR WKH
SODQQLQJ FRQFHSWLRQ DQG GHVLJQ RI WKH VWXG\ SURWRFRO GHYHORSRPHQW
DQG ZULWLQJ WKH PDQXVFULSW DV ZHOO DV EHLQJ UHVSQRVLEOH IRU WKH RYHU
FRQWHQW DV JXDUDQWRU :KLOH \$QD &DUROLQD 5 &KHQ -XOLDQD 5 &KHQ
1DWD &DUORV ODULQR &DOYDQR DQG 3URIHVVURU
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DQG LQWHUSUHWDWLRQ &KHQ :HQ /LQ KHOSHG FRQGXFW WKH DQDO\VLV DQG
LQWHUSUHWDWLRQ RI GDWD \$OO}D\WKRUV UHJG DQG DSSURYHG WKH
PDQXVFULSW

\$FNQRZOHGJPHQW

HHUQ € p D Q Q 0BXQGU