Suicide by crashing into a heavy vehicle: Focus on professional drivers using in-depth crash data

Radun, Igor

2019-08-18

Radun , I , Parkkari , I , Radun , J , Kaistinen , J , Kecklund , G , Olivier , J , Tervo , T & Theorell , T 2019 , ' Suicide by crashing into a heavy vehicle: Focus on professional drivers using in-depth crash data ' , Traffic injury prevention , vol. 20 , no. 6 , pp. 575-580 . <https://doi.org/10.1080/15389588>

<http://hdl.handle.net/10138/308747>

<https://doi.org/10.1080/15389588.2019.1633466>

acceptedVersion

Downloaded from Helda, University of Helsinki institutional repository.

This is an electronic reprint of the original article.

This reprint may differ from the original in pagination and typographic detail.

Please cite the original version.

7LW6XHLFLGH E\ FUDVKLQJ LQWR D KHDY\ YHKLF
GULYHUV XVLQJ LQ GHSWK FUDVK GDWD

,JRU 5DG,XCNHUL 3DHUNLD#D#XQ .DLV\WDOH.HFNDXKQZOLYLHU
7LPR 7H7|YR HV 7KHRUHO0

'HSDUWPHQW RI 3V\FKRORJ\ DQG /RJRSHGLFV)DFXOW\ RI 0H
)LQODQG
6WUHV 5HVHDFK ,QVWLWXWH 6WRFNKROP 8QLYHUVLW\ 6V
7KH)LQQLVK 7UDQVSRUW DQG &RPPXQLFDWLRQV \$JHQF\ 7UD
7XUNX 8QLYHUVLW\ RI \$SSOLHG 6FLHQFHV 7XUNX)LQODQG
/LLNHQQHWXUYD ±)LQQLVK 5RDG 6DIHW\ &RXQFLO +HOVLQN
6FKRRO RI 0DWKHPDWLFV DQG 6DWLVWLFV 816: 6\GQH\ \$X
7UDQVSRUW DQG 5RDG 6DIHW\ 5HVHDFK &HQWUH 816: 6\GQ
,QVWLWXWH RI &OLQLFDO 0HGLFLQH 'HSDUWPHQW RI 2SKWK
)LQODQG

&RUUHVSRRGLQJ DXWKRU DW 'HSDUWPHQW RI 3V\FKRORJ\ D
%R[8QLYHUVLW\ RI +HOVLQNL)LQODQG

† \$W WKH EHJLQQLQJ RI WKLV SURMHFW WKLV DXWKRU ZDV H

%š À Œ•}]vX dZ Œš] o Z • v %μ o]•Z]v dŒ ([/vi
Zšš%•Wll }]X}ŒPlíìXíìôìíñĩô õñôôXîíôX

\$%675\$&7
2EMHF~~WRDB~~ WUDIILF VXLFLGHV W\SLFDOO\ LQYROYH D SDVVHQJHU FDU GUL
GHDWK LV DOPRVW FHUWDLQ GXH WR WKH ODUJH PDVV GLIIHUHQFH EHWZHH
GULYHUV W\SLFDOO\ VXIIHU PLQRU LQMXULHV LI DQ\ DQG KDYH WKXV UHF
VWXG\ ZH IRFXVHG RQ KHDY\ YHKLFOH GULYHUV ZKR ZHUH LQYROYHG DV V
0HWKR:~~QVDQDO~~]HG URDG VXLFLGHV ± LQYROYLQJ D SDVVHQJHU F
XVHG WKH LQ GHSWK URDG FUDVK LQYHVWLJDWLRQ GDWD IURP WKH)LQQ
5HVX~~OW~~ UHVXOWV VKRZHG WKDW DOO EXW WZR FUDVKHV ZHUH KHDG RQ F
EXW RQO\ D IHZ VXIIHUG VHULRXV LQMXULHV 0RUH WKDQ D TXDUWHU UH
FRPSHQVDWLRQ WR KHDY\ YHKLFOH GULYHUV ZDV MXVW DERYH ¼ RQ DY
VLJQLILFDQW ZLWK DYHUDJH LQVXUDQFH FRPSHQVDWLRQ SDLG EHLQJ
GULYHUV FRPPLWWLQJ VXLFLGH DFWHG DEUXSWO\ DQG OHIW WKHP OLWWO
&RQFOXV~~WRB~~QGHV E\ FUDVKLQJ LQWR KHDY\ YHKLFOHV FDQ KDYH DQ LPSDF
GLIILFXOW WR VHH KRZ KHDY\ YHKLFOH GULYHUV FRXOG DYRLG D VXLFLGH
.H\ ZRU~~GD~~Y\ YHKLFOH GULYHUV PRWRU YHKLFOH FUDVKHV YLROHQW VXL

%š Ä œ•}]vX dZ œš] o Z • v %μ o]•Z]v dœ ([/vi
Zšš%•WII }}X}œPIíiXíiôìíñĩô õñôôXîíôX

,1752'8&7,21

,W KDV ORQJ EHHQ NQRZQ WKDW VRPH URDG WUDIILF IDWDOLWLHV DUH WK
YHKLFOH GULYHUV DQG RWKHU URDG XVHUV 7KH QXPEHU DQG SURSRUWLR
RQO\ GXH WR FXOWXUDO IDFWRUV EXW DOVR GXH WR GLIILFXOWLHV LQ LG
GLIIHUHQW MXULVGLFWLRQV ,I QR VXLFLGH QRWH LV OHIW EHKLQG LW PL
DO 7KLV FDQ EH HVSHFLDOO\ GLIILFXOW EHFDXVH VRPH SHRSOH FKR
³DFFLGHQW´ ZRXOG PDVN WKHLU LQWHQWLRQV +HQGHUVRQ DQG -RVHSK
VRFLDOO\ DFFHSWDEOH PDQQHU 0RULOG

)URP WKH WUDIILF VDIHW\ DQG JHQHUDO LQMXU\ SUHYHQWLRQ SHUVSHFWL
DV WKH SUHYHQWLRQ PHDVXUHV DUH ODUJHO\ GLIIHUHQW 6RPH FRXQWUL
1RUZD\ DQG 6ZHGHQ \$LUDNVLQH Q HW DO 7KHUHIRUH PFK UHVHDUF
WKH SUREOHP DQG KRZ WR DGHTXDWHO\ GLVWLQJXLVK VXLFLGHV IURP ³QR
gKEHUJ HW DO

\$QRWKHU FRPSOHPHQWDU\ OLQH RI UHVHDUFK IRFXVHV RQ ULVN IDFWRUV
XVH DJH VH\ DQG VRFLDO FLUFXPVWDQFHV LQFOXGLQJ ILQDQFLDO DQG U
FRPPLWWLQJ VXLFLGH :+2 \$V ZLWK RWKHU W\SHV RI YLROHQW VXLFL
WKDQ ZRPHQ +HUQHWNRVNL DQG .HVNLQH ,VRPHWVI DQG /|QQTYLVW
YHKLFOHV SRVHV OLWWOH UHVWULFWLRQ RQ WKH FKRLFH RI WKLV SDUWL
VXLFLGDO LGHDWLRQ RU WHQGHHQF\ WR EH UHDOLJHG LQ DQ LPSXOVLYH ZD
LPSXOVLYH VXLFLGHV DUH SUREDEO\ OHVV OLNHO\ WR EH OHWKDO WKDQ Q
LQWR D ILJHG EDUULHU H J D WUHH D SLOODU RU D KHDY\ YHKLFOH DW
DWWHPSW

7UDGLWLRQDOO\ WKH IRFXV RI YHKLFXODU VXLFLGH KDV EHHQ RQ VLQJOH
HW DO 3RPSLOL HW DO EHFDXVH UXQQQLQJ RII WKH URDG DQG FU
DWWULEXWHG WR WKH GULYHU\ ORVV RI FRQWURO DQG PD\ PDVN UHDO L
+RZHYHU PRVW FRQILUPHG URDG VXLFLGHV DUH FROOLVLRQV ZLWK DQRW
+HUQHWNRVNL HW DO *DXWKLHU HW DO 6DVVL HW DO 7KH
KHDY\ YHKLFOH GULYHUV QRUPDOO\ GR FDQ SURYLGH YDOXDEOH LQIRUPD
FDU GULYHU MXVW EHIRUH WKH FUDVK

\$Q DQDO\VLV RI URDG VXLFLGHV LQ)LQODQG VKRZH G WKDW ZHUH FR
GLVSDULW\ gKEHUJ HW DO \$QRWKHU)LQQLVK VWXG\ UHSRUWHG WKD
YHKLFOH EXW GLG QRW VSHFL\ WKH H[DFW SURSRUWLRQ +HUQHWNRVNL
VXLFLGHV ZHUH FUDVKHV ZLWK D KHDY\ YHKLFOH %M|UQVWLJ HW DO
FDUV DQG KHDY\ YHKLFOHV SDVVHQJHU FDU RFFXSDQWV DUH PFK PRUH C
GULYHUV 7KLV ORZHU SUREDELOLW\ RI LQMXU\ DQG WKH DERYH PHQWLRQ
KHDY\ YHKLFOH GULYHUV KDYH QRW QRUPDOO\ EHHQ WKH IRFXV RI UHVHDU

%š Å Œ•}]vX dZ Œš] o Z • v %μ o]•Z]v dŒ ([/vi
Zšš%•Wll }X}ŒPlíìXíìôìlíñĩô õñôôXîíôX

KHDY\ YHKLFOHV DV WKH RWKHU SDUW\ LQ VXLFLGH FUDVKHV DQG ZKHWKH
gKEHUJ HW DO UHSRUWHG WKDW LQ DOPRVW RI FDVHV DQRWKHU S
FDVHV

7KHUHIRUH ZH DQDO\JHG FDVHV WKDW KDG EHHQ LQYHVWLJDWHG E\ PXOW
SURMHFW RQ URDG VXLFLGHV IRFXVLQJ RQ KHDY\ YHKLFOH GULYHUV DQG
LQFOXGHV DQ DQDO\VLV RI LQ GHSWK FUDVK GDWD D VXUYH\ FROOHFWHG
GULYHUV D IRFXV JURXS VWXG\ DQG D RQH\H DU IROORZ XS VWXG\ RI KHD
SDUW\ LQ URDG VXLFLGHV 7KH FXUUHQW VWXG\ LV WKH ILUVW RI LWV NLQ
GULYHUV¶ LQMXULHV DQG VLFN OHDYHV DV ZHOO DV WKHLU UHSRUWV FRQ
PHDVXUHV WKH\ DSSOLHG RU IDLOHG WR DSSO\

0(7+2'6
)LQQLVK &UDVK 'DWD ,QVWLWXWH ,Q 'HSWK ,QYHVWLJDWLRQ 0HWKRG
:H XVHG WKH LQ GHSWK URDG FUDVK LQYHVWLJDWLRQ GDWD RI WKH)LQQL
2QQHWWRPXXVLHWRLQVWLWXXWWL 27, 7KLV ZRUOGZLGH XQLTXH GDWD
PRUH WKDQ IDWDO FUDVKHV KDYH EHHQ LQYHVWLJDWHG DQG GRFXPHQ
UHYLVLRQV WKH ODVW RI ZKLFK ZDV LQ (DFK IDWDO FUDVK LV LQYHV
WHDPV FRQVLVWLQJ RI D SROLFH RIILFHU D YHKLFOH HQJLQHUU D WUDIIL
VFLHQWLWV 7KH WHDPV FROOHFW DOO DYDLODEOH LQIRUPDWLRQ DW WKH
H\HZLWQHVVHV DOFRKRO WHVWV DQDO\HV RI YHKLFOH SRVLWLRQV EUD
GULYHU UHFRUGV H J GULYLQJ XQGHU WKH LQIOXHQFH VSHHG LQJ RIIHQ
DEXVH SV\FKLDWULF LOOQHVVHV ,I WKH GULYHU GRHV QRW VXUYLYH WK
GHFHDVHG¶V UHODWLYHV WR OHDUQ RI DQ\ UHOHYDQW EDFNJURXXG LQIRU
ZDV VXVSHFWHG

%DVHG RQ DOO FROOHFWHG PDWHULDO WKH WHDP SURGXFHV D VXPPDU\ U
FDXVH FDOOHG μLPPHGLDWH ULVN IDFWRU ¶ 7KH WHDP DOVR OLVWV WKH
VXLFLGH FDVH WKH WHDP¶V GHFLVLRQ ZRXOG EH EDVHG RQ REMHFWLYH G
EDVHG RQ DXWRSV\ UHVXOWV H\HZLWQHVVHV UHSRUWV H J KLJK VSHHO
DQRWKHU SDUW\ LQ WKH FUDVK H J H\H FRQWDFW VXGGHQ PRYHPHQW
GHSUHVVLQJ VXLFLGDO WKRXJKWV SUHYLRXV VXLFLGH DWWHPSWV DQG
VXLFLGH SV\FKLDWULF LOOQHVVHV

7KLV LQYHVWLJDWLRQ LV VHSDUDWH IURP DQ RIILFLDO SROLFH LQYHVWLJD
PDWHULDO IURP RIILFLDO LQYHVWLJDWLRQV VXFK DV SROLFH H[DPLQDWLR
LQYHVWLJDWLRQV FDQ SRWHQWLDOO\ OHDG WR FULPLQDO SURFHGHGLQJV Z
VHUYHV WUDIILF VDIHW\ SXUSRVHV \$OO WKH RULJLQDO GRFXPHQWV DUH V
YDULDEOHV UHJDUGLQJ SDUWLFLSDQWV YHKLFOHV WKH WUDIILF VLWXDW

%š Ä œ•}]vX dZ œš] o Z • v %µ o]•Z]v dœ ([/vi
Zšš%•Wll }X}œPlíìXíìôìíñĩô õñôôXîíôX

27,¶V FRPSXWHULJHG GDWDEDVH 7ZR VHSDUDWH GDWDEDVHV H[LVW 2QH
RFFXSDQW GLHG :H XVHG WKLV GDWDEDVH LQ RXU VWXG\ 7KH RWKHU FRY

6DPSOH 6HOHFWLRQ
:H XVHG ERWK D FRPSXWHULJHG GDWDEDVH FRYHULQJ VL[\HUV
ZHUH LGHQWLILHG XVLQJ DQ µ,QWHQWLRQDO DFWLRQ¶ FDWHJRUL\ LQ DQ µ,
FRPSXWHULJHG GDWDEDVH D WRWDO RI URDG VXLFLGHV RFFXUUHG GXU
GULYHUV ZH H[FOXGHG VLQJOH YHKLFOH FUDVKHV FUDVKHV EHWZHHQ
D SDVVHQJHU FDU WZR FUDVKHV LQFOXGLQJ D PRWRUF\FOH WZR FUDVKHV
ZKLFK D WUDFWRU ZDV WKH RSSRVLWH SDUW\ 7KH ILQDO VDPSON WKHUH

3URFHGXUH
\$V RIILFLDO H[DPLQDWLRQ UHFRUGV SURYLGH GHWDLOHG LQIRUPDWLRQ UH
UHIHUHQFHV WR SRVVLEOH LQVXUDQFH DQG RWKHU FODLPV DWWHPSWV ZH
DQDO\VLV EHJLQV 7KH ILUVW DXWKRU VFUHHQHG IROGHUV DQG LGHQWL
YHKLFOH GULYHUV 1 27, RIILFLDOV DQG UHVHDFK DVVLVWDQWV WKH
)LQODQG :H UHFHLYHG VR ZH KDG IROGHUV ZLWK H[DPLQDWLRQ UHF

7ZR UHVHDFK DVVLVWDQWV ZHUH HPSOR\HG DQG LQVWUXFWHG E\ WKH IL
LQIRUPDWLRQ IURP WKH RULJLQDO LQYHVWLJDWLRQ IROGHUV 1RQH RI WK
DVVLVWDQWV LQGHSHQQGHQWO\ UH DG WKH RULJLQDO IROGHUV DQG H[WUDF
DJUHHG XSRQ WKH ILQDO YHUVLRQ 7KH ILUVW DXWKRU VXSHUYLVHG WKH
HYDOXDWH WKH 27, WHDPV¶ GHFLVLRQV UHJDUGLQJ ZKHWKHU WKH FDXVH

([WUDFWHG 9DULDEOHV
7KH UHVHDFK DVVLVWDQWV H[WUDFWHG WKH IROORZLQJ YDULDEOHV QDV
OLFHVH ZHUH DOVR FRGHG DV)LQQV FRXQWU\ LQ ZKLFK WKH KHDY\ YHK
LQIRUPDWLRQ QR LQMXU\ PLQRU RU VHULRXV LQMXU\ DQG VLFN OHDYH
µ\HV¶ ZKHWKHU WKH WUXFN ZHQW RII WKH URDG IHOO RQ LWV VLGH RU F
LQIRUPDWLRQ QR SDUWO\ DQG FRPSOHWHO\ WKH WUXFN GULYHU¶V YLH
SUHYHQWLYH DFWLRQ DQG WKH DFWLRQV RI WKH RWKHU GULYHU VORZO\

,QVXUDQFH 'DWD
7KH)LQQLVK ORWRU ,QVXUHUV &HQWUH ,Q)LQQLVK /LLNHQQHYDNXXWXV
LQVXUDQFH DQG SURYLGHG XV ZLWK LQIRUPDWLRQ UHJDUGLQJ WKH LQVX
RXU VDPSON ZHUH WKH KHDY\ YHKLFOH GULYHUV 7KH PDWFKLQJ RI FDUV
SHUIRUPHG LQ KR XV DV 27, LV DQ LQWHJUDO DOWKRXJK LQGHSHQQGHQW S
GDPDJH WR WKH KHDY\ YHKLFOH GULYHUV DQG WKH RZQHUV RI WKHLU YHK

%š Å Œ•}]vX dZ Œš] o Z • v %μ o]•Z]v dŒ ((] /vi
Zšš%•Wll }}X}ŒPlíiXíiôìlíñĩô õñôôXîiîõX

7KH VWXG\ ZDV DSSURYHG E\ WKH 8QLYHUVLW\ RI +HOVLQNL¶V (WKLFDQ 5H
6FLHQFHV +RZHYHU WKH LQVXUDQFH SDUW ZDV QRW VSHFLILHG LQ WKH U
SURMHFW

5(68/76

LQVHUW)LJXUH DERXW KHUH

&UDVK 7\SHV DQG ,QYROYHG 3DUWLFLSDQWV
\$OPRVW DOO FUDVKHV 1 ZHUH KHDG RQ FROOLVLRQV LQFOXGLQJ
PRWRUZD\ 7KH UHPDLQLQJ WZR FUDVKHV RFFXUUHG DW D MXQFWLRQ ,Q R
WUXFN DQG LQ WKH RWKHU D FDU GULYHU ILUVW VWRSSHG KLV FDU LQ D
RQFRPLQJ WUXFN

\$OPRVW DOO FUDVKHV 1 LQFOXGHG WZR YHKLFOHV LQ WKUHH FD
FDVHV ZHUH FROOLVLRQV EHWZHHQ D SDVVHQJHU FDU DQG D WUXFN ,Q
EHFDPH LQYROYHG DIWHU WKH PDLQ FROOLVLRQ DQG LQ WKH RWKHU FDUV
PRVW FDUV WKH WUXFN DOVR KDG D WUDLOHU ,Q WZR FDUV D S
FRPPLWWLQJ VXLFLGH ,Q RQH RI WKHVH WZR FDUV LW VHHPV WKH GULY
KRZHYHU LQ WKH RWKHU FDUV WKLV ZDV QRW FRQILUPHG GHVSLWH WKH
LQMXULHV)RXUWHHQ SDVVHQJHUV ZHUH SUHVHQW LQ WUXFNV)LYH RI

,QMXULHV DQG 6LFN /HDYHV
\$FFRUGLQJ WR WKH FRPSXWHULJHG GDWDEDVH WZR WUXFN GULYHUV ZHUH
KRZHYHU EDVHG RQ WKH LQIRUPDWLRQ H[WUDFWHG IURP WKH H[DPLQDWL
PLQRU LQMXU\ 7KLV PHDQV WKDW DOPRVW RI WKH WUXFN GULYHUV ZHU
YHKLFOH 2XW RI WKH SDVVHQJHUV SUHVHQW LQ WKH WUXFNV WKUHH
FKLOGUHQ ZHUH SK\VLFDQ\ LQMXUH

)URP WKH RULJLQDO IROGHUV ODUJHO\ IURP WKH DYDLODEOH H[DPLQDWL
ZHQW EDFN WR ZRUN LPPHGLDWHO\ DIWHU WKH FUDVK DQG UHSRU
RI FDUV 6LFN OHDYH GXUDWLRQ YDULHG IURP WR GD\ PHDQ
GXUDWLRQ LV QRW NQRZQ DV GULYHUV ZHUH VWLOO RQ VLFN OHDYH ZK
WHUP SK\VLFDQ UHKDELOLWDWLRQ ZDV SUHGLFWHG ZKLOH WKH RWKHU GU
ZDV QRW VXUH ZKHWKHU KH HYHU ZRXOG EH

7KH PDMRULW\ RI WKH GULYHUV ZHUH)LQQLVK FLWLJHQV RU UHVLGHQWV
7KH DYDLODELOLW\ RI H[DPLQDWLRQ UHSRUGV SHUQRPHQ GLQGLUVS
FLWLJHQV UHVLGHQWV DQG WKH UHVW

%š Å Œ•}]vX dZ Œš] o Z • v %μ o]•Z]v dŒ ([/vi
Zšš%•Wll }}X}ŒPlîîXîîôîîñîîôñôôXîîôX

,QVXUDQFH &RQVHTXHQFHV RI WKH &UDVKHV
:H REWDLQHG QR LQIRUPDWLRQ IRU VHYHQ FDVHV DQG QLQH FDVHV KDG LQ
FOHDUO\ GDPDJHG EXW QR LQIRUPDWLRQ DERXW FRPSHQVDWLRQ ZDV DYDL
SDLG WR XQNQRZQ SDUWLFLSDQW)XUWKHUPRUH ZH H[FOXGHG FDVHV ZL
OHDYLQJ FDVHV ZLWK)LQQLVK GULYHUV GULYLQJ WUXFNV UHJLVWHUHG

3HUVRQDO LQMXULHVFRPSHQVDWLRQ\ FRPSHQVDWLRQ SDLG ZDV ¼ ZL
¼ +RZHYHU ZKHQ ZH H[FOXGHG FDVHV LQ ZKLFK QR FRPSHQVDWLRQ Z
¼ \$ERXW RI FRPSHQVDWLRQV ZHUH OHVV WKDQ ¼ OHVV WKDQ
H[FHHGHG ¼

ODWHULDO FRPSHQVDWLRQ PDWHULDO FRPSHQVDWLRQ SDLG ZDV ¼ PH
¼ ,Q RI FDVHV WKH FRPSHQVDWLRQ ZDV OHVV WKDQ ¼ DQG LQ
QRW VXUSULVLQJ JLYHQ WKH FRQVHTXHQFHV RI WKH FUDVKHV IRU WUXFNV

LQVHUW 7DEOH DERXW KHUH

7UXFN 'ULYHU\ 3UHYHQWLYH \$FWLRQ DQG \$FWLRQV RI 'ULYHU &RPPLWWLQJ
\$FFRUGLQJ WR WKH FRPSXWHUL]HG GDWDEDVH QRQH RI WKH WUXFN GULY

LQVHUW 7DEOH DERXW KHUH
LQVHUW 7DEOH DERXW KHUH

2QH GULYHU ZKR ZDV XQDEOH WR UHFDOO DQ\WKLQJ ZDV H[FOXGHG IURP 7
VXLFLGH GULYHU KHDGLQJ IRU WKHLU YHKLFOHV 2QH RI WKHVH WZR ZDV V
LQWR WKH EDFN RI WKH WXUQLQJ WUXFN ,Q WKH RWKHU FDVH WKH WUXFN
FKHFN WKHP DQG WKHQ UHDOL]HG D FDU KDG FUDVKHG LQWR KLV WUXFN\V
QLQH FDVHV ZHUH H[FOXGHG IURP 7DEOH :H REWDLQHG QR FOHDU LQIRU
VL[FDVHV DQG LQ WKUHH FDVHV WKH GULYHUV GLG QRW UHIHU WR WKH D

',6&866,21
7R WKH EHVW RI RXU NQRZOHGJH WKLV LV WKH ILUVW VWXG\ WR IRFXV RQ
WKLV QHJOHFW LV XQIRUWXQDWH DV VXLFLGHV LQYROYLQJ FUDVKLQJ LQW
7KH PDWHULDO GDPDJH FRVWV DUH DOVR VLJQLILFDQW

2XU GDWD VKRZ WKDW RI WKH WUXFN GULYHUV ZHUH LQMXUHG GHVSLW
DQG D WUXFN 7ZR GULYHUV VXIIHUHG VHULRXV LQMXULHV RQH RI ZKRP U
SROLFH LQYHVWLJDWLRQ D WKLUG GULYHU PHQWLRQHGH KDYLQJ GLIILFXOV
WKH WUXFNV DOVR VXIIHUHG PLQRU LQMXULHV

%š À œ•}]vX dZ œš] o Z • v %μ o]•Z]v dœ ([/vi
Zšš%•Wll }}X}œPíìXíìôìíñĩô õñôôXîíõX

:H DOVR IRXQG WKDW DW OHDVW RI WUXFN GULYHUV UHSRUWHG VLFN
GD\ 7KLV LV SUREDEO\ DQ XQGHUHVWLPDWLRQ DV LQIRUPDWLRQ DERXW
2Q WKH RWKHU KDQG LW LV XS WR HDFK GULYHU WR PHQWLRQ SRVVLEOH
WKH\ DUH DVNHG DERXW WKHLU GHPDQGV UHJDUGLQJ WKH FUDVK 6XFK LQ
UHFRUG ,W VHHPV OLNHO\ WKDW D GULYHU ZRXOG PHQWLRQ ORQJ UDWKH
XQGHUHVWLPDWLRQ SUREDEO\ UHODWHV WR VKRUWHU VLFN OHDYHV +RZH
WKDW WKH LGHQWLILHG RI GULYHUV ZLWK VKRUW RU ORQJ VLFN OHDY
ZHUH VWLOO RQ VLFN OHDYH ZKHQ WKH\ PDGH H[DPLQDWLRQ UHSRUWV VR
FRQILUPHG VLFN OHDYH SHULRGV LQ RXU GDWD 7KH LQMXU\ FRPSHQVDWL

\$QHFRWDO HYLGHQFH H[LVWV WKDW VRPH HQWUHSUHQHUV DQG VPDOO
GDPDJHG LQ FUDVKHV HYHQ ZKHQ WKH\ DUH WKH LQQRFHQW SDUW\ DQG UH
DO ,W WDNHV WLPH IRU D WUXFN WR EH UHSDLUHG DQG LI QR UHSD
FRPSDQLHV PLJKW ORVH WKHLU FXVWRPHUV DQG VLJQLILFDQW LQFRPH \$
LQGLFDWHV WKDW PDQ\ WUXFNV KDYH VXVWDLQHG VHULRXV GDPDJH +RZH
WR GHWHUPLQH WKH NLQG RI IXUWKHU GLUHFV DQG LQGLUHFV FRVWV LQF

\$QHFRWDO HYLGHQFH DOVR VXJJHVWV WKDW WKH VXGGHQ DFWLRQV RI D
YHKLFOH OHDYH OLWWOH RSSRUWXQLW\ IRU WKH GULYHUV RI WKH KHDY\ Y
LOOXVUDWH WKLW ,I D KHDY\ YHKLFOH LV WUDYHOOLQJ DW D VSHHG RI
FDU GULYHU VXGGHQO\ GLYHUWV WKHLU YHKLFOH DW D GLVWDQFH RI PH
\$FRUGLQJ WR WKH WUXFN GULYHUV LQ WKLW VWXG\ RQO\ D VPDOO SURS
YHKLFOH LQ D UHODWLYHO\ VORZ PDQQHU ,Q DERXW RI FDVHV 1 W