

Project Chameleon --- Topic : Compensation

Background reading to smoker compensation.

1. Handwritten notes (HWN) on :

RD 14402 - Smoking behaviour on Low delivery cigarettes.

RD1144 Results summary

RD837 - constant P.D. , changed deliveries.

Project Tiger , Project Lynx

2. Project Lynx group data ( %increase DVP -v- M/c)

3. Microfische copies of reports :

RD 897R Creighton/Watts (Smokers response to LD cigs achieved by High PD)

RD 909R ( " " " " " " pinholes )

RD 1300R DEC. Compensation for changed delivery - Review of info.

RD 1144R Smokers response to change in Tar : Nic.

RD 1826 Effect of ventilation on Puff to puff smoke deliveries.

4. Reports :

RD 837-R (G2383) Effects of changed deliveries at constant P.D. on Human smoking

RD1440-R (G2390) Smoking behaviour - Low Delivery Cigs.

RD1144-R (G2392) Smokers response to change in Tar : Nic

RD 2071-R Review of filters which generate smoke swirl and their sensory properties

*These files returned to M/S B. WILKINS CENTRAL FILE 25.8.92*

5. Photocopied : RD 1958-R CCG. Smoking dynamics Exploratory studies

6. Photocopied extracts from RD1958-R

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<u>CHARS</u>	<u>contains</u>
RD 897-R	M/copy
LD 909-R	"
RD 1300-R	"
RD 1144-R	"
RD 1826R	"
RD 837-R	- G2383
RD 1440-R	- G2390
RD 1144R	- G2392
RD. 2071-K	
RD 1958-R	pc.
extract from RD1958	

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10 RD. 2071-L REVIEW OF FILTERS WHICH GENERATE SWIRL  
SWIRL + THEIR SEASONAL PROPERTIES.

11 PC RD1958 CCG SMOKING DYNAMICS  
EXPLORATORY STUDIES.

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SMOKING BEHAVIOR (LOW DELIVERY CIGARETTES)

RD 1440

R1

Now

Beh. SF.

1mg Tar / 0.1mg Nic

1mg Tar / 0.1mg Nic

High Flow App.

10 Smokes

M/C

Seven days  
for each type

Relieves

TH

1.3

1.4

2.7

Nic

0.06

0.14

1.7

No.

7.2

6.7

60 ml puff on R1 + Now.

estimated that smoker took > 0.2 mg Nic.

reports of high irritation & unusual taste.  
checking machines observed out of test.

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Smoking (ATOL) EFFECT OF CHANGE IN AMOUNT OF TIME  
 RD 1144 15 Smokers 10 cigs of same type

	1D			2D			3D		
	BEQ	MID	FIN	BEQ	MID	FIN	BEQ	MID	FIN
TOTAL /s		614.4		590.1			595.7		
	278.8	155.0	180.6	249.1	148.3	173.2	271.5	151.7	172.5
per 1/3 Total TIME AUGHT	5.4	3.3	4.0	5.3	3.3	4.1	5.4	3.5	4.2
	51.6	46.9	45.2	50.8	44.9	42.2	50.3	43.3	41.1
PD.	11.5			11.7			11.6		
Meda. MC	1.56			2.32			2.14		
TAK	36			37			31		
P. NO.	11.5			10.8			11.0		
TAD	23.1			15.9			14.5		
FILT.	20 CA			20 CA			15 / 1001 / 5 CA		

- 1) Significant difference between Smokers on all measured parameters
- 2) Significant differences between 1D & others on
  - Take puff interval lower
  - AV - volume higher
  - AV - number higher
 R. 1D smoked more intensely. (lowest MC Nic)

NB. TAD Nic } 2D & 3D close to each other. although 2D  
 } had similar Tar to 1D.

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RD 837 CONSTANT P. D.  
EFFECT OF CHANGED DELIVERIES AT ~~DIFFERENT P.D.~~

MC DELIVERIES		A	B
	<del>TTT</del>		
	<del>TTT</del>	(30)	(24)
	NIC	(1.68)	(1.36)
	P.D.	14.7	14.2
	Min. P. No.	10.3	10.2
		20 - CA	15 ml/hr / 5 min CA.

6 Subjects  
6 copies  
different days

	Reg.	Mid	FIN	Reg.	Mid	FIN
Total Vol		560		636		
Vol.	242	157	161	277	170	189
No	5.8	4.1	4.4	6.1	4.1	4.7
	41.7	38.3	36.6	45.4	41.5	40.2

highly significant differences between subjects in all parameters

larger total puff volume from lower delivery cigs

usually by longer puffs but no longer duration, although sometimes more puffs and mostly longer held inhalation!

could give faster flow rate.

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1 Tiger funded 2 yrs B9  
 2 Lynx  
 284/85 Switz, Belg, UK  
 Low Tar  
 Middle Tar

MON. 201  
 NEWS OLD  
 OLD OLD  
 apple

Switz	UK
M. Gold	OB OB
1sr. 10s	BH SC
Mel	TRUE
Primes	
Brands	
Camel	TRUE

Mix of 20 sticks / gp.  
 TRUE R1 M. Gold  
 TRUE R1 M. Gold  
 TRUE R1 M. Gold

7 Horsemen  
2 cigs. 1

Pst. Aromat  
 Malbar.  
 M. Gold NCC

Sw  
 R1 320 %  
 TRUE 182 %  
 M. G. 101 %

MALBARO  
~~24%~~ 24%  
 P.S. AROMAT. 47%  
 M. Gold 69%

3 331  
 233  
 117

TAL  
 46  
 157  
 100

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Group Data      LYNX      % INCREASES      Dup. - V - M/C  
 Mean      M. Gold

	% Run	<u>HT</u>	<u>M. TAL</u>
	Belg	73	113
NIC	Sw	101	69
	UK	41	49

0.25  
2.18

TAL	B	<del>82</del> (1.12)	112 (1)
	S	117 (1.16)	100 (1.45)
	UK	57 (1.35)	55 (1.12)

	<u>O.B.</u>	<u>WTA</u>	<u>M TAL</u>
NIC	B	100	110
	S	136	72
	UK	138	51
TAL	B	140 (1.4)	80 (32)
	S	170 (1.25)	63 (31)
	UK	41 (2.97)	31 (31)

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UK

M. à Tar

PwMF = M/C

+ 2% sur - Nic.

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Extract from RDA58R<sup>-45-</sup> CC9 SMOKING DYNAMICS  
EXPLORATORY STUDIES

## CONCLUSIONS

### 5.1.1 General Remarks

The projected plan, with its interconnecting correlations, has not been achieved in full. However, the complexity of various parts which have been clarified to some degree. Much has been learnt about the performance of the cigarettes under varying machine conditions, and from this a "reward for effort" criterion can be advanced. It has become abundantly clear that smokers actually treat the two "machine matched" pairs of cigarettes very differently in one case, where deliveries are essentially equal, and similarly or close to similarly when the "machine match" is not so accurate.

It has not proved possible to determine how the subjective assessments collected relate to smoker intake, and it is clear that the future course of this work must take both the smoker intake and subjective assessment into far greater account.

Equally, to establish a rigorous correlation between smoker subjective response and actual intake, it will be necessary either to provide a physical device to analyse on a puff-by-puff basis, or to develop a sound mathematical model adapted to the peculiar needs of the human smoking situation.

### 5.1.2 Specific Conclusions

#### Section 1 - The Problem

- 1.1 The term "smoking mechanics" is not a true description of the real-life smoking situation.
- 1.2 The phrase "smoking dynamics" or simply "dynamics" is more appropriate and should be considered for future use.

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Section 2 - The Effort Criterion

Laboratory "Effort"

- 2.1 A satisfactory definition of "effort" for present purposes has been attained.
- 2.2 Laboratory apparatus has been developed which can differentiate between the "effort" characteristics of unlit cigarettes.
- 2.3 This apparatus should also be capable of operation on lit cigarettes without major modification.
- 2.4 Four types of "effort" behaviour can be defined.
  - "A" - Different "effort" at common machine delivery.
  - "B" - Similar "effort" at slightly different machine delivery.
  - "C" - "Family relationships". Constant "effort" at widely different deliveries.
  - "D" - Increased "effort" as deliveries are lowered.

There may be other types, and there are certainly intermediate behaviours.

- 2.5 Mathematical relationships have been demonstrated which link the "effort" behaviour to cigarette design. With development, this may allow prediction of "effort" behaviour prior to manufacture, i.e. at the design stage.

Human "Effort"

- 2.6 It has been demonstrated that smokers of one pair of the test cigarettes of matched deliveries have very different behavioural smoking patterns. Equally, similar behavioural patterns at non-matched deliveries have been shown.

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- 2.7 Human subjective data do not always accord with objective data. One half of the sample of smokers "correctly" identify "draw effort" and pressure drop as being directly related. The other half identify higher "draw effort" with lower pressure drop. This situation reflects known consumer reaction and may require more detailed examination.

### Section 3 - The Reward Criterion

- 3.1 Definition of a "reward" can vary dependent upon the situation. Definitions of "reward" at a normal smoking condition are advanced.
- 3.2 Obtaining human "reward" of any smoke component is at present impossible in GR&DC since puff by puff duplication is not available.
- 3.3 The concept of "elasticity" is reviewed and a simple and practical definition is advanced. Data for elasticity of the test cigarettes are given and analysed in terms of the design of the constituent parts of the cigarettes. These include pressure drop, expanded tobacco inclusion, ventilation levels and ventilation styles.
- 3.4 A mathematical definition of the "reward" criterion for the test cigarettes is advanced for a series of puff volumes.

### Section 4 - "Effort" and "Reward"

- 4.1 After the identification of "effort" and "reward" indices (Sections 2 and 3) these can be combined into an "reward for effort" index.

4.2 It can be anticipated that adoption of the reward for effort criterion (or R for E or RFE) to products may lead in three distinct directions.

- (a) Decrease in RFE - if the pressures for league tables at other than standard conditions becomes strong enough.
- (b) Maintenance of current RFE's - as a policy decision.
- (c) Increase in RFE's - as a marketing opportunity, acknowledging the effect this may have on league tables at other than standard conditions.