ProfileSoft

Confiez-nous l'expertise de votre capital humain

TECHNICAL MANUAL

INDEX

Chapter 1
Concept & Model

Chapter 2
Typical & Atypical (outliers)

Chapter 3
Reliability & Validity

Chapter 1

CONCEPT & MODEL

1•1 **CONCEPT AND CONSTRUCT**

1•2 **SCALES CONSTRUCTION**

1•3 **PERSONAL SKILLS (Part I)**
- 1•3•1 Entrepreneurship
- 1•3•2 Motivation
- 1•3•3 Leadership
- 1•3•4 Interaction style
- 1•3•5 Technical orientation

1•4 **GENERIC OCCUPATIONAL SKILLS (Part II)**
- 1•4•1 Communication / Sales
- 1•4•2 Planning / Strategy
- 1•4•3 Personnel Management
- 1•4•4 Supervision

1•5 **PROFESSIONAL WELL-BEING (Part III)**
- 1•5•1 Self-control
- 1•5•2 Resistance to stress
- 1•5•3 Nutrition
- 1•5•4 Physical condition
- 1•5•5 Burnout

1•1 CONCEPT AND CONSTRUCT

The ProfileSoft System is a scientific tool for assessing and developing human potential. Designed to evaluate behaviour related to work performance, the ProfileSoft System is used by organizations to:

- **Assess potential for purposes of:**
  - → selection
  - → promotion
  - → transfer
  - → management

- **Develop human resources**
  - → training
    - communication
    - planning / strategy
    - management
    - supervision
  - → development
  - → motivation

- **Predict performance**

CONCEPT AND CONSTRUCT OF SKILLS AND PERFORMANCE

Surviving and performing in a competitive environment requires a minimum of skills.

Three components

After several thousands of assessments of people who «survive» and perform in their work environment, ProfileSoft Inc. has identified 3 essential components for performance.

What the person IS:

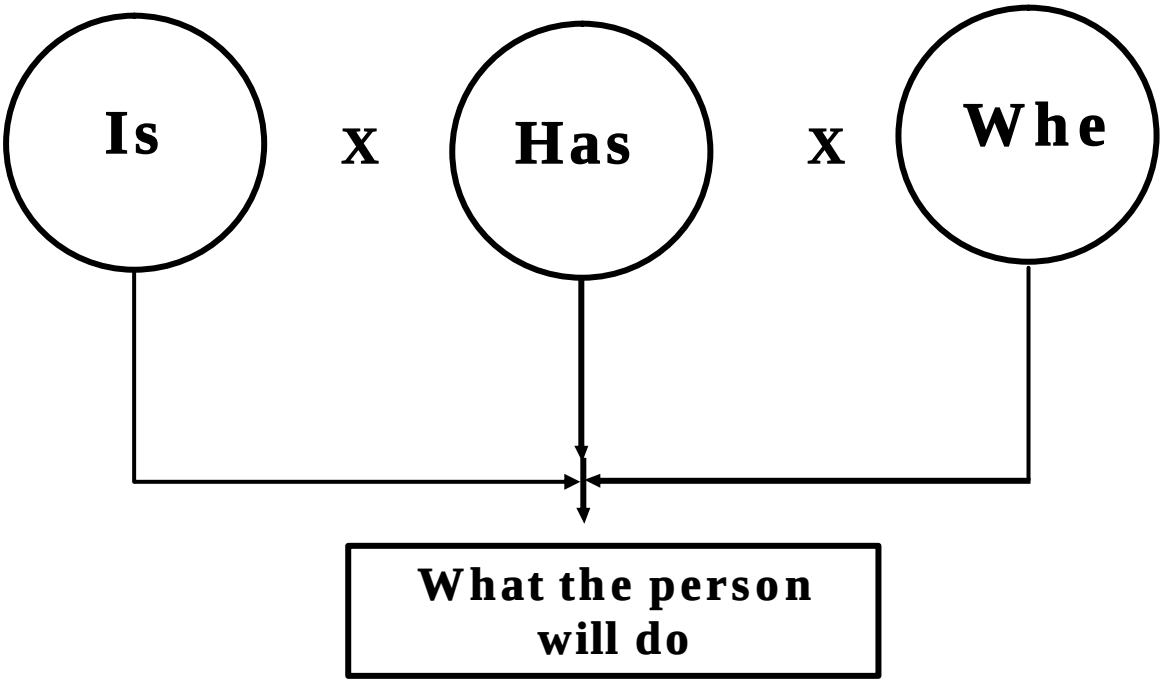
- key behaviours
- reflexes
- automatisms
- intrinsic values
- personality

What she HAS:

- levels of knowledge
- work experience
- skills mastered
  - mental
  - verbal
  - motor

The ENVIRONMENT where she is:

- organizational (structure, team, methods)
- personal (well-being, health, etc.)



These three components increase and constitute skills potential.

Skills potential

For instance, by measuring appropriate variables, an organization is able to determine a person's skills potential (that of an employee or a potential one) in order to assess what that person can do.

Skills vs performance

But good skills don't guarantee good performance. In order to assess performance in a traditional way, many different steps are involved and the cycle is long:

- with his/her skills potential, the person reacts to various work stimuli through activities;
- these activities are eventually transformed into results;
- in order to assess these results, the resources used to achieve them must be taken into consideration;
- and lastly, it is only by establishing ratios and standards of assessment;
- that performance can be assessed.

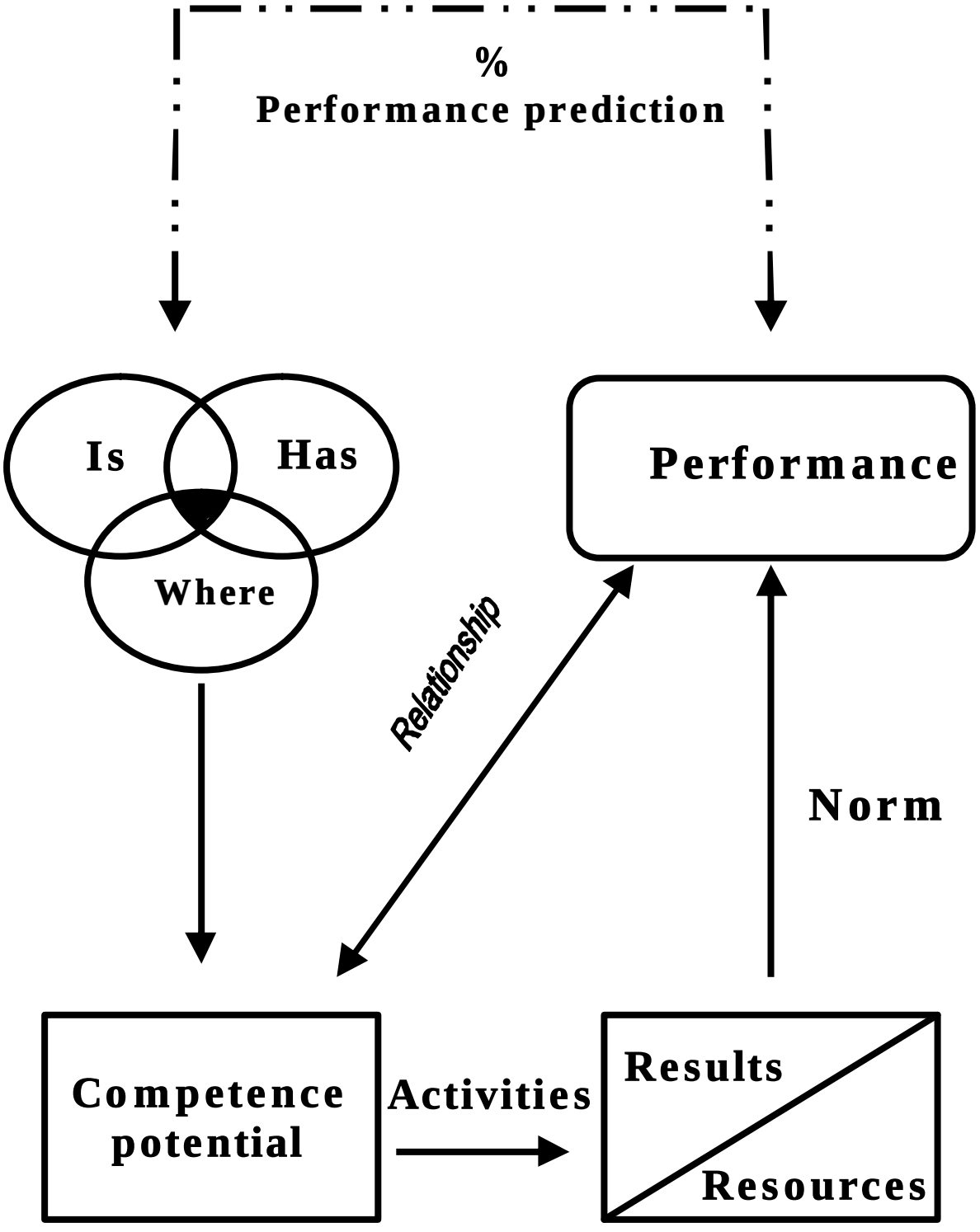
Predictor

Consequently, it is valuable to have a system of evaluation that can predict a person's performance without having to hire him/her, train him/her and try him/her out, with all the person-time that this requires and all the costs it incurs.

ProfileSoft System

Through scientific and technological innovation, ProfileSoft has therefore developed a system of evaluation that can:

- determine skills potential, and
- predict performance.


%
Performance prediction
Is
Has
Where
Performance
Relationship
Norm
Competence potential
Activities
Results
Resources

ProfileSoft System

Is
Behaviours

x

HAS
Training needs
Improvement
Knowledge
Experience

x

Where
Environment
Physical
condition

Entrepreneurship

Capacity an individual has to:

- plan, organize his activities
- manage oneself
- develop work structures
- follow a procedure
- adapt into a structure
- withstand pressure

Motivation

Capacity an individual has to:

- achieve results
- accomplish activities
- take up challenges
- be willing to help

Leadership

Capacity an individual has to:

- function in an independent manner
- function with others
- control one's activities
- perform without help
- perform within a team

Interaction Style

Evaluates an individual's:

- satisfaction gained through interchanges with human being
- approach style with people
- interest for human aspect of business
- capacity to establish new contacts

Technical Orientation

Evaluates an individual's:

- satisfaction derived from technical learning
- attention to details, precision
- interest for theoretical or practical aspect of business
- capacity to undergo technical training

Sales or Communication

Obtain information
Promote interaction
Listen and speak
Interpret
Lead the discussion
Question

Provide information
Consult
Adapt approach
Attract attention

Verify understanding
Make oneself understood
Clarify / confirm
Manage disagreement

Planning / Strategy

Organization & clientele
Know the market
Know the clientele
Know the services

Time management
Establish priorities
Understand procedures
Plan activities

Intervention strategy
Analyze the situation
Know the different steps
Create opportunities

Personnel management

Manpower planning
Plan recruiting
Set standards
Identify emerging professionals

Selection criteria
Establish desired features
Hire according to criteria
Promote equity and equal opportunity

Hiring decision
Lead the interview
Question according to criteria
Select objectively

Supervision

Standards of performance
State expectations
Grant merit

Help and support
Be available
Train employees
Delegate

Plan priorities
Plan the approach
Follow -up on plan
Respond to requests

Decision-making
Reprimand objectively
Negotiate solutions
Solve problems

Self-Control
(short term)

Locus of control
Outside the individual
Happy / unhappy events

Coping with stress
(mid term)

Stress resistance ability
At work
« Recharging batteries »

Nutrition
(long term)

Cholesterol
Sugar
Calories
Salt
Fibre

Physical condition
(long term)

Physical activity
Safe habits in sports activities
Personal care
Prevention

Burnout
(long term)

Physical
Emotional
At work

Actualization and Performance

1•2 SCALES CONSTRUCTION

The ProfileSoft Model (14 scales) is made up of numerous items combined according to an exclusive ProfileSoft methodology. Questionnaire items are combined to form primary scales which are then combined to construct 14 secondary, derived scales.

Scales were constructed using statistical analysis to confirm result quality. Sample used includes 12,000 cases, with the exception of two statistics (BNNFI and ASR) of factorial validity calculated with a sub sample of 2,000 cases.

- Scale accuracy is evaluated using two statistics:

  - **Cronbach's apha.** This fit measure is based on the correlation among items; as correlation among items increases, the closer this statistic is to 1 or 100%. A confidence interval was also calculated for each Cronbach alpha measure.

  - **Scale stability / strength.** It is evaluated through simulation, by randomly varying questionnaire items. This statistic provides the percentage of deviant or atypical cases, in absolute values, lower than 15 (the scale presents values between 0 and 100), between the scale calculated using real items and the scale calculated using simulated items.

- Factorial validity is measured using three statistics:

  - **KMO (Kaiser-Meyer-Olkin).** Fit coefficient of the factorial model obtained during main axis analysis. A value that is too low indicates that the factorial model is inappropriate. An appropriate model has a value near 100%.

  - The **BNNFI (Bentler Not Normed Fit Index).** Model fit measure obtained while confirmatory factorial analysis with EQS software. An appropriate model has a value near 100%.

  - **ASR (Average Standardized Residuals).** This is the average of residuals obtained during confirmatory factorial analysis with EQS software. An appropriate model has a value near 0.

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- The inverse predictive capacity (prediction of items by scale results) has been calculated for:

  I. Personal skills (Part I),
  II. Personal skills (Part I) and generic occupational skills (Part II), and
  III. Personal skills, generic occupational skills (Part II) and occupational well-being (Part III).

  This statistic is obtained in two ways: first, a regression of overall scales for each item (using 6,000 cases), then an estimate of items (of 6,000 other cases). The statistic provides the percentage of items reproduced by scales. An item is said to be reproduced if more than 80% of cases present a margin smaller than 2 (each item having values set between 1 and 10) between the item's real value and the value predicted by the scales.

1•3 PERSONAL SKILLS (Part I)

1•3•1 Entrepreneurship

Scale definition (construct)

A person's ability to:

- plan and organize his/her activities
- be self-managing
- develop work structures
- follow a procedure
- integrate into a structure
- withstand pressure

Number of items

36 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 84% Cronbach's alpha (α)
   - 95% of alphas are higher than 83%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 93% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 93% KMO (model fit coefficient)
2) 91% BNNFI (confirmation of factorial analysis)
3) 3% ASR (average standard residual of factorial model).

Correlation of items with scale

0.574	Really competitive	(0.054)	Never slanders others
(0.433)	Dislikes pressure	0.349	Concentrates with intensity
0.498	Knows what he/she wants and implements changes	0.015	Plans reactions and acts in moderation
(0.525)	Takes his/her time	0.357	Enjoys talking to others
(0.410)	Avoids uncertain situations	0.045	Has sense of duty and order
0.402	Enjoys meeting and mingling with others	0.402	Creates own luck and anticipates problems
0.411	Takes risks	0.289	Likes to know everything
0.542	Always striving ahead	0.398	Easily approaches strangers
(0.137)	Never treats others harshly	0.446	Resistant and perseverant despite difficulties
0.505	Ambitious at work	0.143	Thinks before acting
0.404	Demands continuous effort	(0.059)	Gets along with others and tolerates disagreements
(0.380)	Doesn't like pressure	0.158	Dedicated, polite and concerned about others
0.258	Takes initiative without others' support	0.194	Enjoys peace of mind
(0.296)	Keeps his/her distance	0.416	Always yearning for more
0.338	Insists on quick results	0.371	Achieves results through efforts
0.333	Opportunist, self-reliant	0.441	Vigorous, alert and seeks variety
(0.191)	Tolerant and avoids disagreements	0.514	Takes initiative and reacts promptly
0.496	Able to change things	0.386	Favours personal initiative

1•3 PERSONAL SKILLS (Part I)

1•3•2 Motivation

Scale definition (construct)

A person's ability to:

- achieve results
- carry out activities
- take on challenges
- be of service
- perform

Number of items

48 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 86% Cronbach's alpha(α)
   - 95% of alphas are higher than 86%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 86% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 94% KMO (model fit coefficient)
2) 86% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

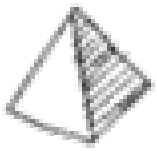
Correlation of items with scale

0.485	Always in a hurry	0.205	Gives his/her best
0.444	Really competitive	0.087	Concentrates with intensity
0.433	Obstinate, persistent and relentless	0.176	Takes risks
0.360	Direct and to the point	0.348	Argumentative, provocative and goal-oriented
(0.476)	Waits patiently	0.059	Has sense of duty and order
(0.205)	Doesn't like pressure	0.048	Enjoys talking to others
0.422	Ambitious at work	0.098	Defends a cause
0.308	Not easily swayed	0.283	Takes initiative and reacts promptly
(0.205)	Tolerant and avoids disagreements	0.180	Resistant and perseverant despite difficulties
0.079	Follows procedures	0.139	Sincere and honest with others
(0.448)	Takes his/her time	0.320	Insists on quick results
0.336	Quick-tempered	0.062	Easily approaches strangers
0.154	Always punctual	0.358	Always striving ahead
(0.078)	Insecure facing uncertainty	0.134	Opportunist, self-reliant
0.086	Takes initiative without others' support	0.331	Competitive and has the will to succeed
0.342	Holds to his/her opinions	0.245	Vigorous, alert and seeks variety
(0.086)	Plans reactions and acts in moderation	0.145	Likes to know everything
(0.002)	Reacts poorly to criticism	0.148	Creates own luck and anticipates problems
(0.051)	Enjoys peace of mind	0.280	Determined to succeed
0.040	Dedicated, polite and concerned about others	0.246	Knows what he/she wants and implements changes
(0.192)	Dislikes pressure	0.115	Has timely, appropriate comments
0.188	Demands continuous effort	0.126	Keeps commitments and is supportive of others
0.296	Always yearning for more	(0.001)	Helpful
(0.051)	Tries to please	0.131	Finds satisfaction in new ideas

1•3 PERSONAL SKILLS (Part I)

1•3•3 Leadership

Scale definition (construct)



A person's ability to:

- work independently
- work with others
- control his/her activities
- perform individually
- perform with a team

Number of items

28 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 80% Cronbach's alpha (α)
   - 95% of alphas are higher than 79%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 84% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 92% KMO (model fit coefficient)
2) 91% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

Correlation of items with scale

0.480	Can't be influenced	0.316	Argumentative, provocative and goal-oriented
(0.307)	Insecure facing uncertainty	0.297	Holds to his/her own opinions
0.410	Quick-tempered	(0.045)	Accepts himself/herself
0.377	Always striving ahead	(0.102)	Dedicated, polite and concerned about others
0.372	Takes initiative without others' support	0.183	Resistant and perseverant despite difficulties
(0.316)	Satisfied with simple things	(0.008)	Concentrates with intensity
0.347	Not easily swayed	0.283	Takes initiative and reacts promptly
0.114	Doesn't like pressure	(0.115)	Competent and always willing to help
(0.230)	Tries to please	0.214	Vigorous, alert and seeks variety
0.360	Takes risks	0.145	Competitive and has the will to succeed
0.278	Insists on quick results	(0.191)	Helpful
0.043	Demands continuous effort	0.262	Knows what he/she wants and implements changes
(0.308)	Takes his/her time	0.121	Determined to succeed
(0.022)	Defends a cause	0.108	Always yearning for more

1•3 PERSONAL SKILLS (Part I)

1•3•4 Interaction style

Scale definition (construct)

Measures:

- satisfaction derived from communicating with human beings
- style of approaching people
- interest in the human aspect of business
- ability to establish new contacts

Number of items

54 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 84% Cronbach's alpha (α)
   - 95% of alphas are higher than 83%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 76% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 96% KMO (model fit coefficient)
2) 89% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

Correlation of items with scale

(0.511)	Has no mood swings	0.046	Defends a cause
(0.492)	Always satisfied	(0.010)	Dislikes pressure
0.188	Seeks the company of others	(0.108)	Demands continuous effort
(0.392)	Shows interest at work	(0.007)	Vigorous, alert and seeks variety
(0.075	Doesn't like pressure	(0.160)	Ambitious at work
0.212	Tries to please	(0.069)	Takes initiative and reacts promptly
0.381	Takes things too seriously	(0.061)	Argumentative, provocative and goal-oriented
(0.232)	Always striving ahead	0.081	Dedicated, polite and concerned about others
0.095	Enjoys meeting and mingling with others	(0.095)	Has sense of duty and order
0.398	Critical of self and others	(0.044)	Competitive and has the will to succeed
0.078	Reacts poorly to criticism	(0.142)	Resistant and perseverant despite difficulties
(0.496)	Always patient	(0.157)	Really competitive
0.194	Takes his/her time	(0.146)	Opportunist, self-reliant
(0.112)	Not easily swayed	0.117	Helpful
(0.008)	Determined to succeed	(0.086)	Concentrates with intensity
0.120	Likes to know everything	(0.151)	Has timely, appropriate comments
(0.149)	Plans reactions and acts in moderation	(0.162)	Knows what he/she wants and implements changes
(0.101)	Takes initiative without others' support	(0.152)	Creates own luck and anticipates problems
(0.350)	Never feels isolated from others	0.113	Enjoys talking to others
(0.006)	Highly regarded by others	(0.056)	Realistic and practical
0.085	Insecure facing uncertainty	(0.020)	Sincere and honest with others
(0.243)	Enjoys peace of mind	(0.073)	Keeps commitments and is supportive of others
(0.039)	Insists on quick results	(0.007)	Always yearning for more
0.054	Easily approaches strangers	(0.036)	Gives his/her best
0.384	Concerned about amount of work to be done	(0.064)	Attracts and retains attention
(0.046)	Tolerant and avoids disagreements	0.006	Finds satisfaction in new ideas
(0.081)	Takes risks	(0.050)	Responds to clients' requests

1•3 PERSONAL SKILLS (Part I)

1•3•5 Technical orientation

Scale definition (construct)

Measures:

- satisfaction derived from technical learning
- interest in detail and precision
- interest in the technical or practical aspect of business
- ability to undergo technical training

Number of items

48 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 88% Cronbach's alpha (α)
   - 95% of alphas are higher than 88%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 76% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 95% KMO (model fit coefficient)
2) 89% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

Correlation of items with scale

0.334	Keeps his/her distance	(0.083)	Likes to know everything
(0.288)	Doesn't like pressure	(0.307)	Tries to please
(0.303)	Always yearning for more	(0.211)	Concentrates with intensity
(0.282)	Ambitious at work	(0.007)	Conscientious and logical
(0.262)	Tolerant and avoids disagreements	(0.235)	Resistant and perseverant despite difficulties
(0.268)	Takes initiative without others' support	(0.113)	Finds satisfaction in new ideas
0.067	Meticulous	(0.283)	Defends a cause
0.255	Takes his/her time	(0.065)	Realistic and practical
0.122	Direct and to the point	(0.247)	Vigorous, alert and seeks variety
(0.261)	Argumentative, provocative and goal-oriented	(0.195)	Opportunist, self-reliant
(0.248)	Insists on quick results	(0.319)	Enjoys talking to others
(0.201)	Enjoys peace of mind	(0.200)	Takes initiative and reacts promptly
(0.121)	Insecure facing uncertainty	(0.153)	Dedicated, polite and concerned about others
(0.268)	Demands continuous effort	(0.221)	Creates own luck and anticipates problems
0.040	Accepts himself/herself	(0.268)	Helpful
(0.120)	Reacts poorly to criticism	(0.179)	Has timely, appropriate comments
(0.313)	Easily approaches strangers	(0.256)	Determined to succeed
(0.263)	Takes risks	(0.195)	Favours personal initiative
(0.121)	Dislikes pressure	(0.125)	Always striving ahead
(0.261)	Really competitive	(0.176)	Gives his/her best
(0.205)	Has sense of duty and order	(0.194)	Knows what he/she wants and implements changes
(0.022)	Precise, realistic and enjoys mental reflection	(0.285)	Competitive and has the will to succeed
(0.138)	Plans reactions and acts in moderation	(0.159)	Keeps commitments and is supportive of others
(0.219)	Not easily swayed	(0.153)	Sincere and honest with others

1•4 GENERIC OCCUPATIONAL SKILLS (Part II)

1•4•1 Communication

Scale definition (construct)

To assess knowledge level in terms of communication techniques to:

- obtain information
- provide information
- verify understanding

Number of items

23 meaningful questions

Reliability

Two measures used:

1) Cronbach's alsph and confidence interval
   - 88% Cronbach's alpha (α)
   - 95% of alphas are higher than 87%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 88% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 95% KMO (model fit coefficient)
2) 91% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

Correlation of items with scale

0.609	Answers objections with confidence	0.383	Knows requirements for a promotion
0.527	Recognized as a specialist/expert	0.388	Has timely, appropriate comments
(0.316)	Exaggerates in a conversation	0.329	Resistant and perseverant despite difficulties
0.478	Confidently simplifies his/her products/services	0.375	Solves problems with other departments
0.536	Always knows the reasons for a failure	0.413	Knows the financial impact of his/her decision
0.541	Succeeds in making an indifferent person talk	0.392	Gives credit where credit is due
0.025	Uses a sales pitch approach to communicate	0.438	Promotes the job during interviews
0.540	Adapts to all types of personalities and positions	0.415	Improves hiring procedures
0.494	Understands subtle expressions	0.431	Precise in selection recommendations
0.195	Can improve cooperation from colleagues/clients	0.304	Sincere and honest with others
0.553	Attracts and retains attention	0.437	Knows all the different types of clients
0.387	Takes initiative and reacts promptly		

1•4 GENERIC OCCUPATIONAL SKILLS (Part II)

1•4•2 Planning / Strategy

Scale definition (construct)

To measure knowledge level in terms of planning / strategy techniques for:

- organization & clientele
- time management
- intervention strategy

Number of items

25 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 68% Cronbach's alpha (α)
   - 95% of alphas are higher than 66%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 87% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 91% KMO (model fit coefficient)
2) 90% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

Correlation of items with scale

(0.523)	Often wrongly believes to have everyone's cooperation	(0.246)	Believes that things happen by chance
(0.521)	Finds the cycle too long (sales, production...)	(0.218)	Exaggerates in a conversation
(0.520)	Poorly responds to client's potential needs	0.153	Attracts and retains attention
(0.425)	Favours one product/service over others	(0.243)	All too often forgets the qualities of others
0.329	Knows the competitor's products/services	0.053	Always knows the reasons for a failure
(0.512)	Gets little cooperation from colleagues/clients	0.155	Precise in selection recommendations
(0.236)	Invests efforts according to client's potential	0.158	Competitive and has the will to succeed
(0.085)	Can increase quality of services rendered	(0.257)	Delays in filling vacancies
0.319	Knows all the different types of clients	(0.247)	Easily influenced and makes mistakes
0.219	Answers objections with confidence	0.098	Responds to clients' requests
(0.363)	Complains about the many work demands	(0.332)	Obtains little cooperation from other departments
0.131	Gives credit where credit is due	(0.360)	Always tackles the same problems
(0.072)	Tries to please		

1•4 GENERIC OCCUPATIONAL SKILLS (Part II)

1•4•3 Personnel management

Scale definition (construct)

To assess knowledge level in terms of human capital management to:

- plan work force and identify next generation
- establish selection criteria
- make recommendations or select candidates

Number of items

28 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 72% Cronbach's alpha (α)
   - 95% of alphas are higher than 70%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 84% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 93% KMO (model fit coefficient)
2) 92% BNNFI (confirmation of factorial analysis)
3) 3% ASR (average standard residual of factorial model).

Correlation of items with scale

0.557	Improves hiring procedures	0.243	Recognized as a specialist/expert
(0.551)	Delays in filling vacancies	0.324	Knows the financial impact of his/her decisions
0.399	Recruits many different types of people for the same job	0.289	Competitive and has the will to succeed
(0.502)	Obtains little cooperation from other departments	0.280	Determined to succeed
0.507	Trains his/her successor	(0.291)	All too often forgets the qualities of others
(0.390)	Often disagrees on the choice of a candidate	0.231	Always knows the reasons for a failure
0.372	Recruits people from minority groups	0.268	Can increase quality of services rendered
0.454	Knows requirements for a promotion	(0.239)	Exaggerates in a conversation
0.236	Promotes the job during interviews	0.282	Succeeds in making an indifferent person talk
0.374	Answers objections with confidence	0.216	Satisfied with time needed by employees to perform
0.318	Knows what he/she wants and implements changes	(0.320)	Always tackles the same problems
(0.323)	Complains about the many work demands	(0.261)	Gets little cooperation from colleagues / clients
(0.326)	Poorly responds to client's potential needs	0.381	Knows how to reprimand personnel
0.380	Gives credit where credit is due	0.325	Solves problems with other departments

1•4 GENERIC OCCUPATIONAL SKILLS (Part II)

1•4•4 Supervision

Scale definition (construct)

To assess knowledge level in terms of monitoring techniques to:

- establish standards of performance
- provide help and support
- plan priorities
- make decisions

Number of items

17 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 75% Cronbach's alpha (α)
   - 95% of alphas are higher than 73%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 93% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 93% KMO (model fit coefficient)
2) 94% BNNFI (confirmation of factorial analysis)
3) 5% ASR (average standard residual of factorial model).

Correlation of items with scale

0.614	Precise in selection recommendations	0.494	Responds to clients' requests
(0.545)	Always tackles the same problems	0.544	Answers objections with confidence
0.587	Knows how to reprimand personnel	0.424	Able to change things
(0.507)	Complains about the many work demands	0.550	Improves hiring procedures
(0.407)	His/her employees are surprised when disciplined	0.473	Knows requirements for a promotion
0.306	Allows little margin for errors	0.489	Gives credit where credit is due
0.324	Satisfied with time needed by employees to perform	0.469	Attracts and retains attention
0.523	Knows the financial impact of his/her decisions	0.374	Trains his/her successor
0.510	Solves problems with other departments		

1•5 PROFESSIONAL WELL-BEING (Part III)

1•5•1 Self-control

Scale definition (construct)

Assess the level of self-control to:

- deal with positive, pleasant events
- deal with unfortunate, unpleasant events
- exercise self-control

Number of items

22 meaningful questions

Reliability

Two measures used:

1) Cronbach' alpha and confidence interval
   - 71% Cronbach's alpha (α)
   - 95% of alphas are higher than 70%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 87% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 93% KMO (model fit coefficient)
2) 90% BNNFI (confirmation of factorial analysis)
3) 5% ASR (average standard residual of factorial model).

Correlation of items with scale

0.198	Never loses anything	0.365	Sincere and honest with others
0.116	Takes initiative without others' support	0.348	Gives his/her best
(0.293)	All too often forgets the qualities of others	0.395	Easily understood in conversation
0.172	Gets what he/she deserves	0.400	Determined to succeed
0.183	Accepts himself/herself	0.404	Keeps commitments and is supportive of others
0.098	Wants to do everything quickly	0.319	Physically fit and has a good appetite
(0.282)	Believes that things happen by chance	0.365	Favours personal initiative
(0.301)	Easily influenced and makes mistakes	0.103	Tries to please
0.372	Creates own luck and anticipates problems	0.225	Has sense of duty and order
0.424	Able to change things	0.231	Satisfied with a job well done
0.354	Achieves results through efforts	0.189	Competent and always willing to help

1•5 PROFESSIONNAL WELL-BEING (Part III)

1•5•2 Resistance to stress

Scale definition (construct)

Assess the level of ability to:

- tolerate stress
- deal with work related pressure
- recover

Number of items

30 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 80% Cronbach's alpha (α)
   - 95% of alphas are higher than 79%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 92% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 92% KMO (model fit coefficient)
2) 85% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

Correlation of items with scale

0.589	Prone to headaches and backaches	(0.041)	Physically fit and has a good appetite
(0.477)	Has no mood swings	0.454	Anxious, exhausted and tired
0.303	Watches his/her weight	0.188	Has trouble sleeping
0.422	Doubts his/her abilities	0.228	Believes that things happen by chance
0.045	Relaxed and sleeps soundly	0.158	Exaggerates in a conversation
0.502	Feels tired and run-down	0.233	Suffers from stomach aches
0.382	Eats when lonely or bored	0.156	Forgets meetings, deadlines or personal belongings
0.581	Suffers from headaches, neck or backaches	0.180	Delays in filling vacancies
0.030	Relaxes easily	0.207	Poorly responds to client's potential needs
0.059	Uses stimulants or tranquillizers	(0.268)	Shows interest at work
0.374	Takes things too seriously	0.257	Always tackles the same problems
0.008	Enjoys peace of mind	0.295	Concerned about amount of work to be done
(0.470)	Always patient	0.229	All too often forgets the qualities of others
0.103	Quarrels often	0.284	Easily influenced and makes mistakes
0.348	Nervous without apparent reason	0.175	Obstinate, persistent and relentless

1•5 PROFESSIONAL WELL-BEING (Part III)

1•5•3 Nutrition

Scale definition (construct)

Assess symptoms of occupational burnout with respect to eating habits:

- cholesterol level
- sugar intake
- rich foods (calories)
- salt intake
- fibre intake

Number of items

41 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 76% Cronbach's alpha (α)
   - 95% of alphas are higher than 74%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 100% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 89% KMO (model fit coefficient)
2) 83% BNNFI (confirmation of factorial analysis)
3) 3% ASR (average standard residual of factorial model).

Correlation of items with scale

(0.573)	Consumes sweetened drinks more than once a week	(0.061)	Eats organ meats (liver...) more than once a week
(0.566)	Eats fried foods more than 3 times a week	(0.435)	Salts food before tasting it
(0.534)	Snacks frequently in the evening	(0.155)	Quarrels often
0.399	Eats high-fibre cereals	(0.361)	Eats visible fat on meat
(0.444)	Adds salt to food preparation	(0.402)	Snacks on candy
(0.525)	Eats at fast food restaurants more than once a week	(0.081)	Often eats dairy products
(0.462)	Eats red meat more than 4 times a week	(0.359)	Eats prepared, frozen or fast food
(0.418)	Does other activities while eating (watch TV...)	(0.272)	Has a Danish or donuts for breakfast
(0.434)	Eats deli meats more than twice a week	(0.226)	Drives after drinking alcohol or taking medication
0.426	Eats whole -wheat or rye bread	0.179	Takes care of dental hygiene
(0.408)	Takes more than one helping of food at mealtime	(0.200)	Drinks more than 5 caffeine drinks per day
(0.408)	Eats quickly	(0.218)	Suffers from stomach aches
(0.271)	Prepares alcoholic drinks with mixers	(0.192)	Takes more than 2 alcoholic drinks per day
(0.323)	Eats more than 4 eggs/week	0.136	Exercises vigorously 3 or 4 times/week
(0.365)	Eats sweet desserts more than once a week	0.160	Keeps physically fit
(0.354)	Skips a meal	0.257	Always patient
0.357	Eats bran or oatmeal muffins	(0.182)	Has trouble sleeping
(0.570)	Snacks on salty foods (chips...)	(0.187)	Prone to minor illnesses (colds, flu...)
0.343	Eats fresh, uncooked fruits and vegetables	0.262	Avoids overeating
(0.095)	Uses stimulants or tranquillizers	0.215	Puts time aside on agenda for exercising
(0.371)	Eats when lonely or bored		

1•5 PROFESSIONAL WELL-BEING (Part III)

1•5•4 Physical condition

Scale definition (construct)

Assess symptoms of occupational burnout in terms of:

- physical activity
- safe habits in sports activities
- personal care
- prevention

Number of items

31 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 88% Cronbach's alpha (α)
   - 95% of alphas are higher than 87%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 100% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 93% KMO (model fit coefficient)
2) 89% BNNFI (confirmation of factorial analysis)
3) 4% ASR (average standard residual of factorial model).

Correlation of items with scale

0.721	Does warm-ups before exercising	0.417	Considers physical activity to be fun
0.702	Puts time aside on agenda for exercising	0.321	Maintains car in good condition
0.485	Watches his/her weight	0.367	Takes care of eyesight
0.493	Ensures safety before buying equipment	0.628	Exercises vigorously 3 or 4 times/week
0.347	Keeps an adequate distance from others when driving	(0.044)	Avoids strenuous exercise
0.517	Regularly practices self-examination to detect signs of illness	0.547	Keeps physically fit
0.694	Exercises even in times of stress	0.270	Drives with seatbelt fastened
0.708	Gets fit before undertaking a strenuous sport	0.334	Copes well with stress
0.462	Seeks medical help when necessary	0.332	Eats whole-wheat or rye bread
0.612	Monitors the intensity of exercise (pulse rate)	0.407	Physically fit and has a good appetite
0.190	Drives close to the posted speed limit	0.396	Takes care of dental hygiene
0.045	Exercises beyond his/her limits	0.395	Eats fresh, uncooked fruits and vegetables
0.571	Chooses hotels with sports facilities	0.273	Improves hiring procedures
0.704	Exercises to strengthen muscles	0.385	Eats high-fibre cereals
0.400	Avoids overeating	0.338	Eats bran or oatmeal muffins
(0.199)	Drives after drinking alcohol or taking medication		

1•5 PROFESSIONAL WELL-BEING (Part III)

1•5•5 Burnout

Scale definition (construct)

Assess symptoms of occupational burnout in terms of psychological perception:

- physical exhaustion
- emotional exhaustion
- work-related exhaustion

Number of items

29 meaningful questions

Reliability

Two measures used:

1) Cronbach's alpha and confidence interval
   - 86% Cronbach's alpha (α)
   - 95% of alphas are higher than 86%.
2) Simulation on scale stability / strength
   - Variation of +/ - 1 point at each item for 12,000 cases
   - 97% of simulated results present a margin that is 15% smaller than those obtained with real result.

Validity

Three measures used:

1) 94% KMO (model fit coefficient)
2) 89% BNNFI (confirmation of factorial analysis)
3) 3% ASR (average standard residual of factorial model).

Correlation of items with scale

0.639	Always patient	(0.512)	Takes things too seriously
0.559	Never feels isolated from others	(0.472)	Has trouble sleeping
(0.615)	Feels tired and run-down	0.628	Has no mood swings
0.479	Copes well with stress	(0.233)	Quarrels often
(0.463)	Gets little satisfaction from social activities	(0.501)	Concerned about amount of work to be done
(0.535)	Critical of self and others	(0.407)	Suffers from stomach aches
(0.401)	Works harder but reaps less results	(0.493)	Anxious, exhausted and tired
(0.369)	Prone to minor illnesses (colds, flu...)	(0.349)	Reacts poorly to criticism
0.091	Discusses personal problems with friends	(0.356)	Complains about the many work demands
0.505	Shows interest at work	(0.372)	Prone to headaches and backaches
(0.374)	Forgets meetings, deadlines or personal belongings	(0.315)	Poorly responds to client's potential needs
0.615	Always satisfied	(0.331)	Easily influenced and makes mistakes
(0.166)	Uses stimulants or tranquillizers	(0.274)	Exaggerates in a conversation
(0.496)	Suffers from headac hes, neck or backaches	(0.350)	Always tackles the same problems

Chapter 2

TYPICAL AND ATYPICAL (OUTLIERS)

2•1 **FREQUENCY AND CORRELATIONS**
- 2•1•1 Sample Description
- 2•1•2 Frequency and correlation among questions
- 2•1•3 Frequency and correlation among various scales

2•2 **MEANS AND CORRELATIONS STABILITY**
- 2•2•1 Production of sub sample
- 2•2•2 Comparisons between sample and sub sample

2•3 **EFFECTS OF GENDER AND LANGUAGE**

2•4 **DETECTING ATYPICAL CASES (outliers)**
- 2•4•1 Presentation of detection method
- 2•4•2 Efficacy of D.O. method
- 2•4•3 Results, applications and conclusions (99,5%)

2•1 FREQUENCY AND CORRELATIONS

2•1•1 Sample Description

The basic sample is made up of more than 12,000 ProfileSoft questionnaires that are filled out on a voluntary basis given the confidentiality of the data contained therein.

Each questionnaire is completed according to instructions featured on the questionnaire. Questionnaires must be filled out completely and individually. The process requires some ½ hour. Questions are coded from 1 to 10 and divided into sections, each section having a specific key. Personal data is kept strictly confidential. Respondents are not obliged to supply names, addresses, age or any other information they consider to be personal in nature.

The sample is made up of a majority of French speaking individuals (99.5% versus 0.5%) and males (69.4% versus 30.6%). The lower percentage of English speaking individuals contained in the sample does correspond to more than 50 people. During statistical analysis, non parametric methods are used, as required.

Respondents' age and place of residence are not used in calculations. The model assumes that data are divided into two types:

- the first type of data is made up of scales that are quite constant over time (regardless of age) and are related to psychological characteristics that are relatively permanent in adult populations;

- the second type of data is based on constant scales for a period of time estimated at two years. These second scale types depend more on respondent's life experiences than on age. As for the place of residence, moving frequently can easily bias data. As a general rule, neither the place of residence nor the age are considered reliable data.

2•1•2 **Frequency and correlations among questions**

An analysis of frequency and correlation among questions in the ProfileSoft questionnaire is conducted to establish standards. Groups of people can be compared to such standards to confirm or infirm that they display features that are identical to those of the basic sample. Correlations can vary from approximately 0% to 50% in absolute values. They are significant with a confidence level of 95%.

Established standards for frequency and correlations can also be used to detect deviant, atypical cases (outliers). Analyses conducted with statistical techniques developed by ProfileSoft reveal that a person who responds randomly can be detected with an approximate probability that is superior to 99%. Should an individual attempt to distort the scales system for personal reasons, it is expected that the detection percentage would be sufficiently high to justify bringing data processing to a halt and consulting a specialist to determine the cause of the observed deviation between that person's answers and established standards.

2•1•3 **Frequency and correlations among various scales**

Observed correlations among various scales vary from 0 to 60%, although they usually stand between 0% and 30% in absolute values. The confidence level is 95%.

In terms of frequency, scales differ from questions through standardization to make distribution uniform. As a result, each scale is spread from 0 to 100. Moreover, distribution is uniform: 1% of sample with a scale result between 0 and 1, 1% between 1 and 2, etc. For example, in an interval that corresponds to scale results that vary from 30 to 70, 40% (70%-30%) of the sample would be found in that same spread. The advantage of such a distribution is interpretative in nature. It is crucial that differences between results obtained and the standard for a given population be interpreted the same way by everyone.

2•2 MEANS AND CORRELATIONS STABILITY

2•2•1 Production of Sub Sample

In order to perform certain statistical analyses involving structural analysis, the size of the basic sample had to be reduced by using a randomly generated sub sample. In fact, it is impossible to perform certain analyses using EQS software given the extremely large basic sample. Moreover, a very large sample slows down the analysis process, which is clearly a disadvantage in situations requiring numerous analyses. A sub sample of 2,000 cases was generated in accordance with a process specially designed by SPSS software program.

The size of the sub sample was established in keeping with the following criteria:

- feasibility of EQS analysis,
- rapid analysis, and
- conservation of statistical features.

It was determined that a sample made up of 2,000 cases would best meet the above criteria.

2•2•2 Comparisons between sample and sub sample

Determining the size of the sub sample (2,000 cases) is the result of a comparative statistical analysis. For example, significant discrepancies are revealed when using a sample size of 1,000 for certain correlations among questions. For a sample size of 2,000, such discrepancies are rare.

To determine that 2,000 cases are sufficient, descriptive statistics **(frequency, means, typical deviations, etc**.) were compared to those of the basic sample to confirm their similarity. It was also revealed that analyses could be done rapidly and that the size was not too large for the EQS software. Positive results were obtained and the sub sample was used for a series of succeeding analyses.

2•3 EFFECTS OF GENDER AND LANGUAGE

Statistical analyses were performed to determine if there are numerous differences between answers provided by males and females, English speaking individuals and French speaking individuals, including various combinations of GENDER and LANGUAGE variables (French speaking males versus French speaking females, etc.). Results reveal that differences are of minor significance and there is no reason to establish specific standards for each targeted group.

Variables, other than gender and language, could give rise to other valid standards. Future developments will provide the opportunity to specifically identify groups and to establish standards automatically. The process of detecting atypical cases (outliers) specific to such groups will also be undertaken. For example, in the case of a pre selection process for a sales position, it would be relevant to detect an individual whose results are atypical when compared to a group of sales' people in the same field and for whom required standards have been identified.

2•4 DETECTING ATYPICAL CASES (outliers)

2•4•1 Presentation of detection method

The D.O (Detecting Outliers) is based on marginal and joint distribution (two by two) of responses to questions contained in the ProfileSoft questionnaire. These distributions are an integral part of the system standards. The objective of this method is to quantify the deviation between the typical sample standard and individual results. As a result, a person who really does not meet the standard is considered to be an outlier. This method differs from other methods because of its capacity to take distribution forms into account (not simple means or other similar statistics).

There are three versions of the D.O. method:

- marginal,
- joint, and
- combined.

The marginal version is based solely on observed frequency of answers to the ProfileSoft questionnaire, i.e., marginal distributions. The joint version is based on joint distributions and the combined version of marginal and joint distributions. The basic principle of this method is the same for all three versions. It is founded on the principle of maximum likelihood or reasonableness. Consequently, if a response, or a pair of responses, are improbable when compared to the standard, the answer is scored low. Otherwise it is increased. The algorithm takes into account the forms of normal distributions to give weight to scores obtained for answers and paired answers (depending on the version of the method used). Scorings are summed up to obtain a global, standardized score to establish the score level beyond which results are considered to be "atypical".

2•4•2 **Efficacy of D.O. method**

In order to confirm the efficacy of the D.O. method, a sample was randomly generated using SPSS software. For each question of the questionnaire, a random answer (equiprobable) between 1 and 10 was provided. This sample was then added to a sample of real cases. In total, there were 1,024 real questionnaires and 1,024 fictive questionnaires. A D.O. analysis was produced on this sample.

Other experiences using real cases were conducted to confirm that cases considered "atypical" deviate significantly from established standards.

2•4•3 **Results, applications and conclusions (99.5%)**

Results reveal a classification rate of 99.5%. Such results are conservative given that cases not properly classified are real cases that eventually are labelled "atypical" following verification.

The marginal version is almost as effective as the joint and combined versions of the ProfileSoft questionnaire.

Results reveal that the D.O. method could be used to detect suspicious cases or outliers. Anyone attempting to falsify results (or who simply does not meet established standards) is very likely to deviate from the standard for a certain set of questions. In such cases, and for that series of questions, we can assume deviations that are, at the very least, as significant as the random deviations observed in the simulation process. As a result, this reveals that if the set of questions is large enough, it is most likely that that person will be classified as an outlier or “atypical case”.

Chapter 3

RELIABILITY and VALIDITY

3•1 **MODEL RELIABILITY**
- 3•1•1 Cronbach's Alpha
- 3•1•2 Stability / Strength
- 3•1•3 Conclusions

3•2 **FACTORIAL VALIDITY MODEL**
- 3•2•1 Statistical Results
  - Kaiser-Meyer-Olkin
  - Bentler Not Normed Fit Index
  - Average Standardized Residuals
- 3•2•2 Conclusions

3•3 **INVERSE PREDICTIVE CAPACITY (I.P.C.)**
- 3•3•1 Construction of factors by items
- 3•3•2 Reconstruction of items by factors
- 3•3•3 Conclusions

3•1 MODEL RELIABILITY

This chapter deals with the acquirement of reliability measures for ProfileSoft System's scales. Reliability measures correspond to Cronbach's Alpha values (α) on the overall items making up a scale. Another reliability criterion is the scale stability / strength that can be measured through simulations.

A summary of results obtained for each scale is presented in Table 1.

3•1•1 Cronbach's Alpha

Included among recognized reliability measures is Cronbach's alpha statistic. This statistic varies from 0 to 1. A high value supports results' reliability. The following is a simplified interpretation of the Cronbach's alpha values:

- less than 60% low reliability,
- 60% acceptable reliability,
- 80% high reliability, and
- 90% and over very high reliability.

Cronbach's alpha statistic is based on correlations among items. It is assumed that such items are an underlying factor, i.e., that the direct addition of items is assumed to be an estimator of the underlying factor.

A confidence interval indicates statistical precision. A 0.95 interval level signifies a 95% reliability indicator that the statistic can be found in that interval. We are interested here in a unilateral rather than bilateral interval since a value that is too small can be unacceptable, which is not the case for a higher value. The inferior level of the alpha is that of a unilateral confidence interval on the left of the 0.95 level. It is obtained through a "bootstrap" effect on the sample of 12,000 cases. The bootstrap is a statistical technique which consists in using numerous sub groups of the original sample to estimate statistical variations. In this case, 4,000 alpha evaluations were used on sub samples of 5,000 cases. The lowest level found is the 5th percentile of the 4,000 case sample, i.e. 5% of the bootstrap sample are inferior to this level. There is a two point difference in the alpha for each of the 14 system scales.

3•1•2 **Stability / strength**

The objective of this technique is to evaluate scale strength. If someone fills out a questionnaire twice, there will be some slight variations in answers provided; the question is, would this make a significant difference in scale results? In other words, if answers to questions vary slightly, will the resulting scale have the same score? The process consists in simulating the value of items using a 12,000 sample, adding -1, 0 or 1 values with standard probability for each item, using values between 1 and 10. This rule must obviously be adjusted for the 1 and 10 extremes. If the item has a value of 1 in the simulation it will take on values of 1 and 2 with probabilities of 2/3 and 1/3 respectively; the rule is similar for 10. For each scale, the scale score is calculated. Next, we use the difference in absolute values between both scores, the one obtained with original values and the one obtained with the items' simulated values. The resulting statistic in Table 1 represents the percentage of cases, among the 12,000, that present a deviation (in absolute values between the score obtained with the original values and the score obtained with simulated values) smaller than 15 on a scale of 0 to 100. More details are presented in the simulation graphics of each scale. For one point of the curve, the abscissas value represents a percentile of the 12,000 cases, i.e. the percentage of cases where the deviation is smaller than the ordinate value.

3•1•3 Conclusions

For each scale, statistical analyses support the scale's reliability hypothesis. There is a factor made up of various items **(between 17 and 54 items)** with a high Cronbach's alpha. The confidence interval of 95% for the latter indicates that the Cronbach's alpha is superior to:

- 78.8% in terms of personal skills (Part I),
- 65.8% in terms of generic occupational skills (Part II), and
- 69.5% for occupational well-being (Part III).

Item simulation confirms the reliability of scale scores. A one point random variation at each item results in a deviation that is smaller than 15 points in derived scales in more than 75% of cases. Scales presented in Part III (Nutrition habits, Physical Condition and Over work) are particularly stable with deviations of less than 15 points in 95 % of cases. ProfileSoft System's scales can therefore be considered highly reliable with respect to observed test outcomes.

3•2 FACTORIAL VALIDITY MODEL

3•2•1 Statistical Results

This section deals with the acquisition of factorial validity measures for ProfileSoft System's scales. Validity measures appear as statistics:

- KMO — Kaiser-Meyer-Olkin,
- BNNFI — Bentler Not Normed Fit Index, and
- ASR — Average Standardized Residuals.

Each scale is "approximated" by a linear combination of a small number of factors that can be used to represent the correlation between variables (items) that make up the scale. Such factors make up a factorial model supported by principal axis analysis and by a confirmatory analysis with the EQS software (Structural equation). The sample of 12,000 cases was used to obtain the KMO statistic. As it is difficult to use such a large sample with the EQS software, a random sub sample of 2,000 cases was used for BNNFI and ASR statistics.

Table I presents a summary of results obtained for each scale. The following statistics are illustrated:

KMO

Kaiser-Meyer-Olkin is a fit indicator obtained during principal axis analysis. A low value indicates that the correlation between pairs of variables (items) cannot be explained by other variables and, as a result, such factors cannot represent the items. As a general rule, values are in the order of 90%. The following is an interpretation scale:

- 50% — too low,
- 60% — acceptable
- 70% — average,
- 80% — good, and
- 90% and over — excellent.

BNNFI

The BNNFI is a model fit measure obtained during confirmatory factorial analysis with the EQS software. The model is considered to be adequate for values recorded at 90% or more.

ASR

This is another model fit measure obtained during confirmatory factorial analysis using the EQS software. It is the average of the model's standardized residuals. A value lower than 0,050 indicates a model that reproduces inter-item correlation effectively.

3•2•2 Conclusions

Results are very satisfactory for each scale. There is a factor made up of various items. Statistics support the factorial validity of this factor (High KMO and BNNFI and low ASR).

The conclusion can be drawn that ProfileSoft System's scales are the direct result of a valid factorial model according to measures presented.

3•3 INVERSE PREDICTIVE CAPACITY (I.P.C.)

3•3•1 Construction of factors by items

Reliability of each of the 14 scales was calculated using the two (2) following statistics:

- Cronbach's alpha and its confidence interval, and
- Stability / Strength.

Results revealed an average value of 80% for the 28 reliability statistics obtained.

Factorial validity of the fourteen (14) scales was calculated using the three (3) following statistics:

- Kaiser-Meyer-Olkin (KMO),
- Bentler Not Normed Fit Index (BNNFI), and
- Averaged Standardized Residuals (ASR).

Results revealed an average value of 93% for the 42 factorial validity statistics obtained.

3•3•2 Reconstruction of items by factors

The system uses 200 meaningful items (questions) to create 14 measure scales that come together to evaluate the three following dimensions:

Part I **Personal skills,**
Part II **Generic occupational skills, and**
Part III **Occupational well-being.**

When scales are produced with questions, part of the information used is taken from the questionnaire. A valid scales system should allow reconstruction of the questionnaire information. In other words, one should be capable of partially predicting answers to questions in a questionnaire based on the results of the system's scales.

The inverse predictive capability (IPC) of a scale system is its ability to reconstruct a questionnaire through its knowledge of system results. More specifically, the IPC is calculated as the percentage of questions reproduced compared to the total number of questions in the questionnaire. For example, a system that reproduces 75% of the questions is said to have an IPC of 75%.

A series of scale systems (models) are developed using the ProfileSoft questionnaire using factorial analysis techniques. The objective of such analysis is to prove that the current system is complete in the sense that any new scale (combinations of questions forming an unobservable factor) is already explained by a set of current system scales. A high IPC guarantees the validity of such an interpretation. Indeed, the scale is constructed using questions. If questions can be predicted, the resulting scale can also be predicted. A high IPC signifies that questions can be predicted precisely. As a result, the high system IPC means that any new scale can be predicted using existing system scales.

This analysis was conducted for Part I, cumulated Parts I and II, and then for all three parts together. The 12,000 cases were separated into two groups. With the first group, a linear regression of the scales (primary, secondary and derived) was undertaken with each of the items included in that Part. The "stepwise regression method" from SPSS was used. Next the same items of the second group were evaluated using the linear relation found in the first group and by rounding out results to obtain a whole value between 1 and 10. The IPC is calculated as being the percentage of items reproduced compared to the total items in the questionnaire. An item is said to be reproduced when more than 80% of cases reveal a deviation (between the predicted value and the initial value) that is lower than or equal to 2 on a scale of 1 to 10. The three IPC graphs illustrate results with the proportion of items reproduced on the axis of ordinates for a percentage of cases presenting a deviation lower than 2 in abscissas. For example, in the graph presented in Part I, for 80% (in abscissas) of cases with a deviation that is smaller than two corresponds to 89% (in ordinates) of the items in this Part. In other words, for 89% of Part I items, the deviation (between the item's real and predictive values) is inferior to 2 in 80% of cases.

3•3•3 Conclusions

In conclusion, the IPC of the ProfileSoft System is high. Its scale system allows very precise ProfileSoft questionnaire reconstruction using scales' results. Scales are used to gather a major part of the data contained in the items.

IPC results, for cumulated dimensions are as follows:

I. 89.2% of items (74 / 83) are reproduced for personal skills,

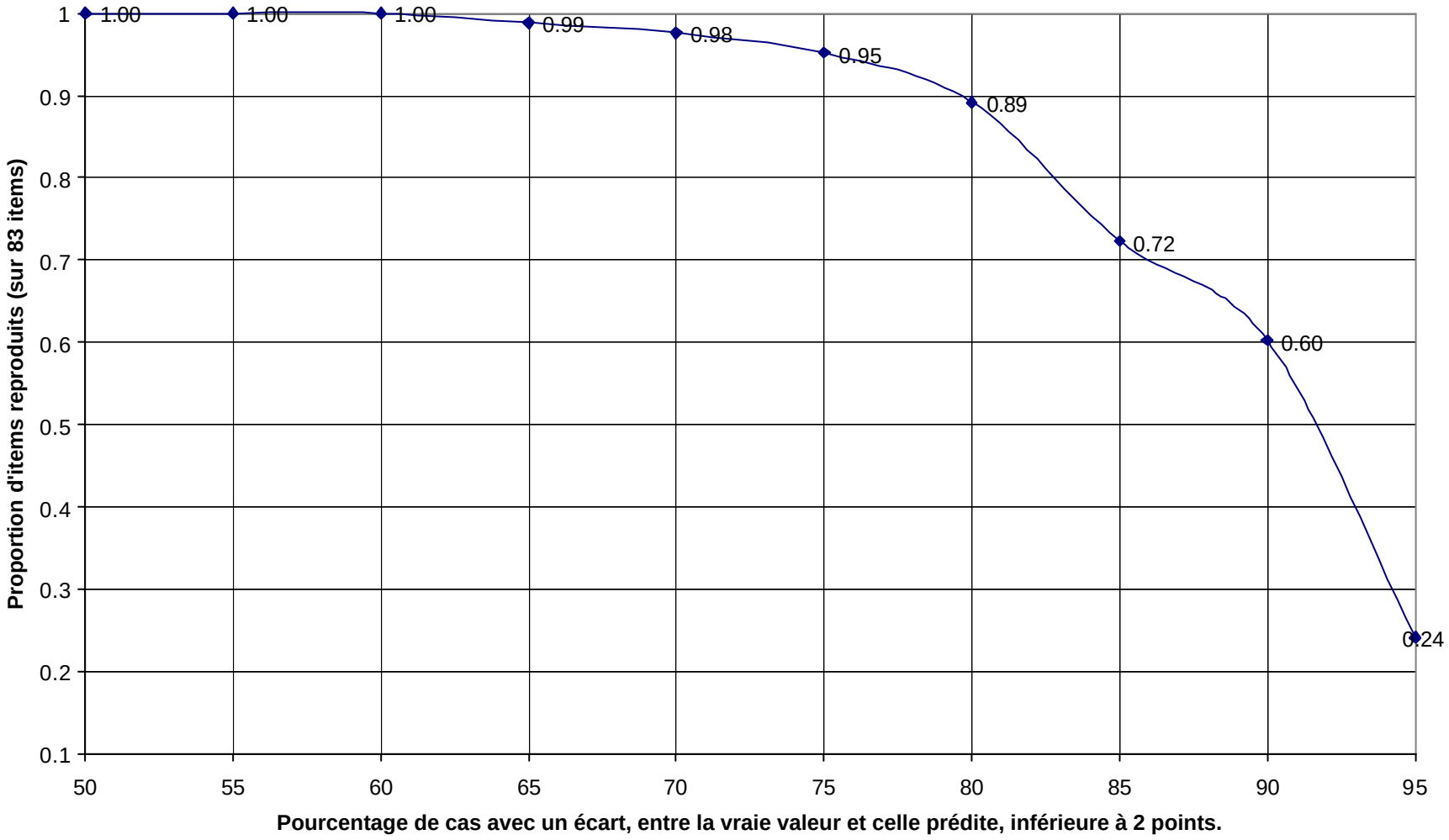
II. 90.3% of items (112 / 124) are reproduced for personal skills and generic occupational skills, and

III. 81.0% of items (162 / 200) are reproduced for the three parts: personal and general occupational skills and occupational well-being.

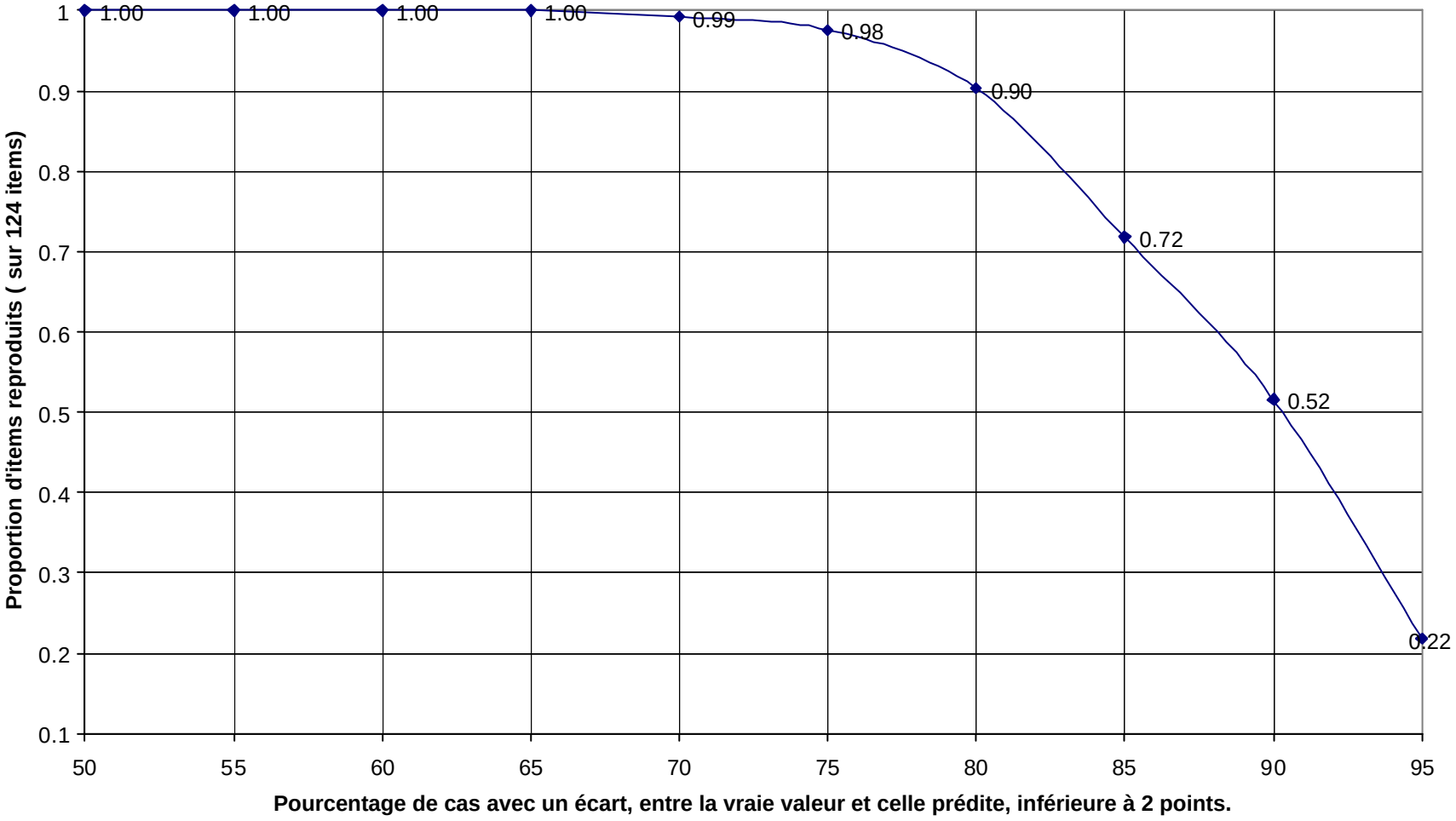
TABLE 1
RELIABILITY RESULTS AND FACTORIAL VALIDITY

DIMENSION	MODEL	# ITEMS	RELIABILITY			VALIDITY		
			Cronbach's Alpha (a)	Alpha confidence Interval (%)	Strength (%)	KMO (%)	BNNFI (%)	ASR
Part I Personal skills	**Entrepreneurship**	36	83.6	82.8	93.1	92.7	90.9	0.0348
	Motivation	48	86.3	85.7	86.2	94.4	86.2	0.0437
	Leadership	28	79.7	78.8	86.4	92.0	91.2	0.0414
	Interaction Style	54	84.2	83.4	76.1	95.6	89.2	0.0412
	Technical Orientation	48	88.4	87.8	75.5	95.4	88.5	0.0410
Part II Generic occupational skills	**Communication**	23	87.9	87.4	88.4	95.1	91.3	0.0423
	Planning / Strategy	25	67.5	65.8	87.4	91.2	90.1	0.0398
	Personnel Management	28	71.7	70.2	83.7	93.2	92.1	0.0339
	Supervision	17	74.6	73.2	93.0	93.1	93.5	0.0450
Part III Occupational Well-being	**Self-control**	22	71.1	69.5	87.2	92.5	90.1	0.0481
	Coping with stress	30	80.2	79.1	91.6	92.3	85.1	0.0355
	Nutrition	41	75.9	74.1	99.9	88.8	82.7	0.0311
	Physical condition	31	87.5	87.1	99.9	93.2	88.8	0.0413
	Burnout	29	86.3	85.6	97.3	93.5	88.6	0.0336

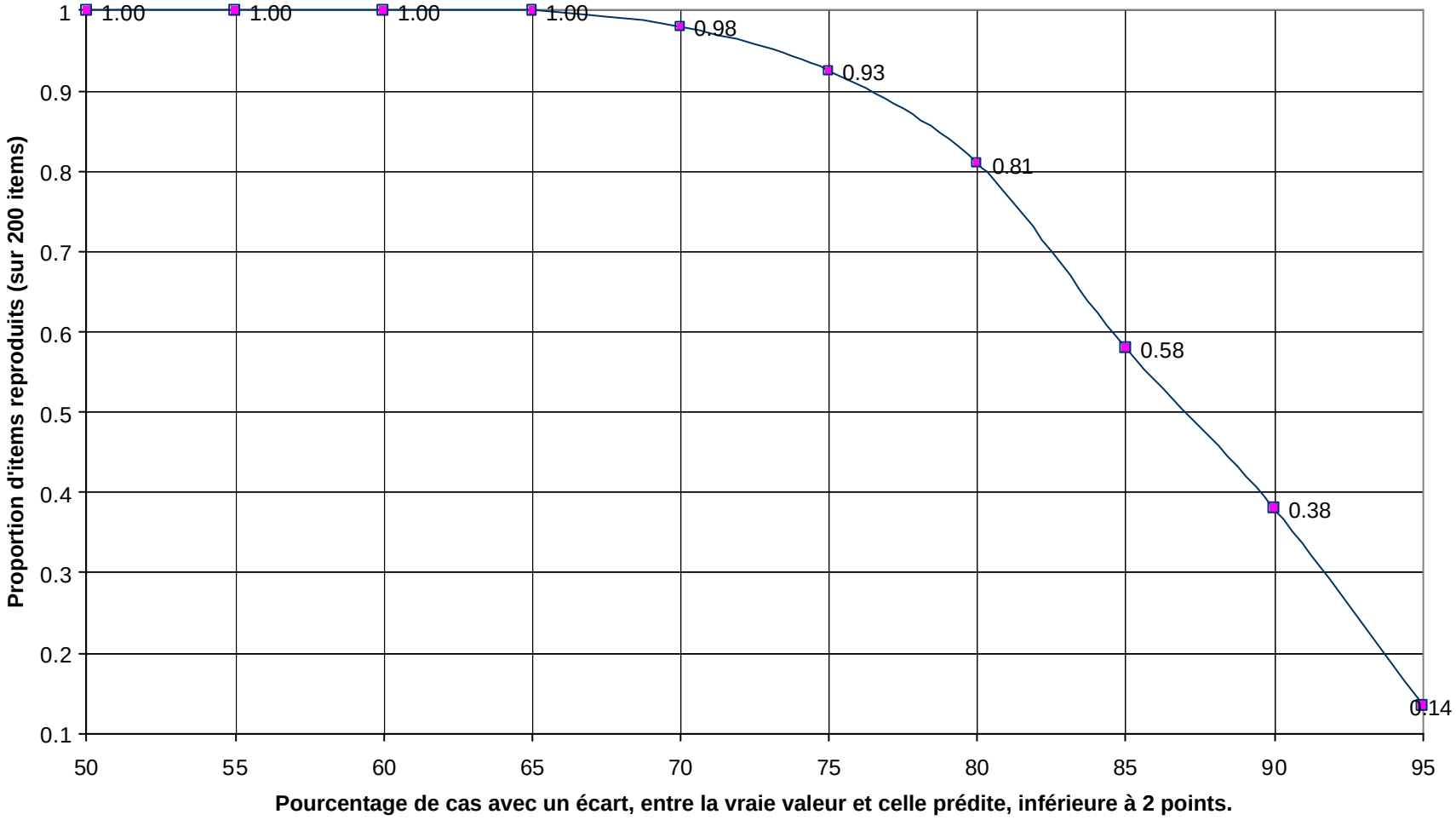
CPI: items prédits par les échelles (15) de la compétence personnelle.
"spit half": régression sur 6000 cas, prédiction des 6000 autres cas.



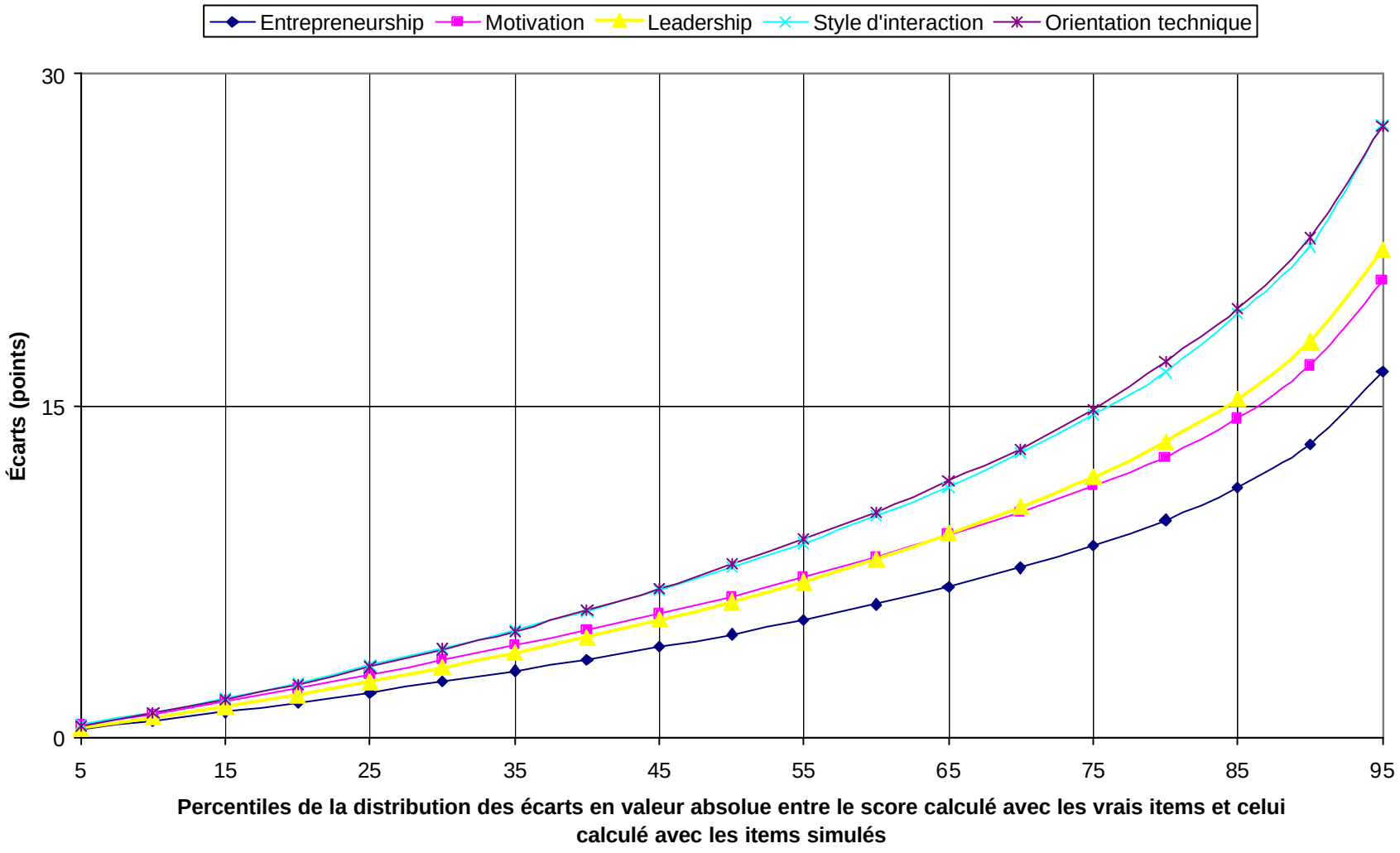
CPI: items prédits par les échelles (32) des compétences personnelle et professionnelle générique.
"split half": régression sur 6000 cas, prédiction des 6000 autres cas.



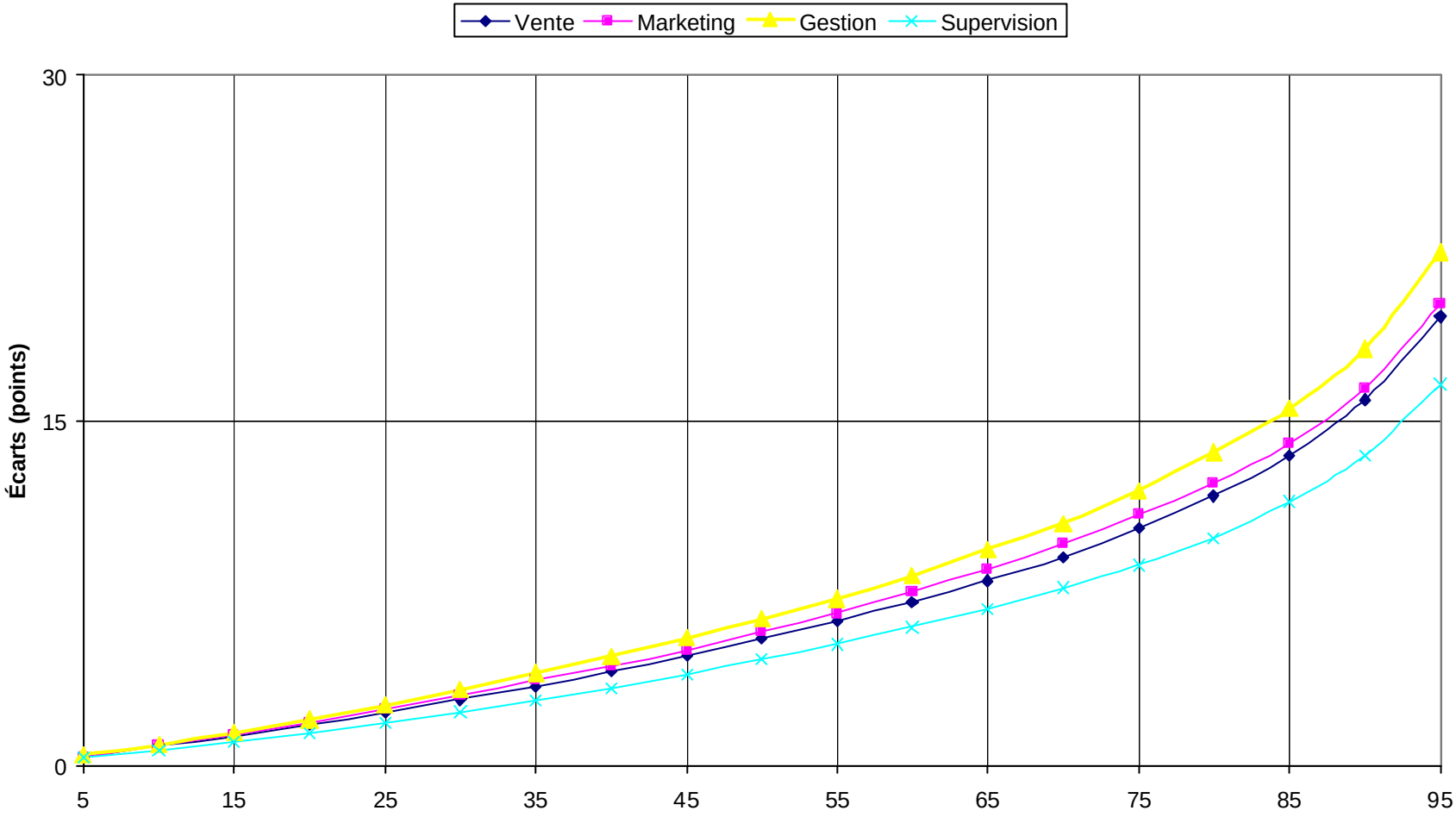
CPI: items prédits par les échelles (49) des compétences personnelle et professionnelle générique et du bien-être professionnel.
"split half": régression sur 6000 cas, prédiction des 6000 autres cas.



Résultat de simulation (stabilité / robustesse) pour les échelles de la compétence personnelle (Partie I)



Résultat de simulation (stabilité / robustesse) pour les échelles de la compétence professionnelle générique (Partie II)



Résultat de simulation (stabilité / robustesse) pour les échelles du bien-être professionnel (Partie III)