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Sommario	<p>The present thesis collects both theoretical and mathematical results representing the basis for the development of Formal Psychological Assessment (FPA). FPA arises from the application in the clinical psychology context, and, more specifically, in the psychodiagnostic assessment, of two mathematical psychology theories: Knowledge Space Theory (KST) and Formal Concept Analysis (FCA). The first two chapters of the thesis aim at introducing all the basic concepts further used in the last three chapters when presenting both formal and clinical results of the three years work. In the first chapter we introduce the state of art in psychological assessment in general and, specifically, in psychodiagnostic assessment. We focus on the so called vertical integration (i.e. the hierarchy of successive diagnostic depths), on clinical interview, on semi-structured interviews (SCID I and II), and on the CBA 2.0 battery. These elements are crucial with respect to FPA. In fact, the main aim of FPA is the construction of an adaptive assessment tool able to work as a semi-structured interview and to provide the clinician with a certainly correct inference procedure based on logical implication. This assessment model has its natural forerunner in the diagnostic battery CBA 2.0 that is a reference point for cognitive behavioral assessment in Italy. The authors of CBA 2.0 were the first psychologists feeling the need of creating a tool not only able to provide a diagnostic label, but also to collect the crucial elements for</p>

a standardized case formulation. In the second chapter are introduced both formal and mathematical details of KST and FCA. The basic concepts of the two theories will be presented together with those specific elements used in formalizing FPA. More specifically we will refer to concepts like knowledge space, knowledge structure, skill map and Basic Local Independence Model (BLIM) for KST; and to concepts like formal object, formal attribute, formal context and formal concept for FPA. Finally, we will explore potential overlaps between the two theories in the perspective of their conjoint application in the clinical framework. In this respect, we will show how it is possible, through some formal passages, to derive a knowledge space from a formal context (consisting in a boolean matrix objects \times attributes). These passages represent the theoretical base for the application presented in chapter three. In the third chapter are presented the results of the application of KST and FCA to a set of clinical items. Such application is aimed at building a knowledge space whose probabilistic parameters have been tested through the BLIM. This chapter presents the first possible methodology to derive the starting point for FPA. The core idea here is the opportunity to describe each psychological disorder (as a formal object in FCA) using a set of symptoms a diagnostic characteristics referred to a specific theoretical background (the formal attributes of FCA). Thus it seems plausible to build a formal context having the items of a questionnaire as objects and the diagnostic criteria investigated by each single item as attributes. In this way it will be possible to better investigate the characteristics of a subject. This information will be much more complete than the mere numeric score of the test. The possibility to shift from FCA to KST is crucial for the application of BLIM and the model validation. Furthermore, out of the validation, it is possible to obtain a set of indexes for each item (i.e. false positive and false negative probabilities) useful in model eventual reformulation and calibration. In the fourth chapter of this dissertation we introduce a different way to derive the starting point of FPA. This methodology totally refers to KST and, more specifically, to the concept of skill multi map obtained through the so called competency model. In this case the basic matrix, containing once again items in rows and diagnostic attributes in columns, represents a skill multi map. In the chapter the advantages of this second approach are presented: the possibility to deflate to 0 false positive and false negative parameters for each single item; the possibility to have more than one symptomatic configuration behind the positive answer to a specific item; the possibility to detect specific attributes for single items; the possibility to estimate probability values to n potential latent classes; the possibility to estimate the probability of each single attribute in each single latent class. Finally, in the last chapter, we introduce a different approach derived from the latest developments carried out at the ALEKS Corporation. In fact, these corporation, representing the worldwide most relevant practical application of KST, is shifting from the expert query to the database query in building knowledge structures. The employed databases are those collected through the years at the corporation. The interrogation is based on an algorithm that selects and tests the prerequisite relations among items satisfying a set of probabilistic parameters. This algorithm has been applied to a set of clinical items administered to a large sample of individuals (the same used in the previous chapters). The so built structure (this time totally free from any link with eventually underlying diagnostic criteria) represents a further potential method

to realize FPA. In conclusion, advantages and limitations are discussed for all the presented approaches, and some further developments of FPA are suggested.

Localizzazioni e accesso

http://memoria.depositolegale.it/*/http://paduaresearch.cab.unipd.it/3477/1/PhD_Thesis_Spoto.pdf
