



Adopting Content Valid Minimum Qualifications Reduces Adverse Impact But Decreases Applicant Test Performance

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Minimum Qualifications

- All organizations engage in personnel selection
- Sophistication of the selection methods varies considerably between organizations
- Usually includes a screening of minimum qualifications (i.e., screen application or resume)
- Government agencies rely heavily on the use of minimum qualifications (Buster, Roth & Bobko, 2005; Levine, Maye, Ulm & Gordon, 1997)

Definition of Minimum Qualifications (MQs)

- “A statement of the minimum level of competence the individual must have for a job” (Gibson & Prien, 1977, p. 447)
- “Statements of education, experiences and/or closely related personal attributes needed to perform a job satisfactorily, that are used as standards to screen applications” (Levine et al., 1997, p. 1009)



Purpose of the MQ Screen

- Screen out applicants who are obviously unfit for the job
- Screen in applicants who can perform the job at a minimally acceptable level
- If an applicant does not pass the minimum qualifications screen, they are not invited to additional testing stages



Traditional MQs

- Most common form of MQs used
- Required education and years of experience (Seberhagen, 2000)
- Assumption that requiring education and years of experience means the applicant has the KSAs required to perform the job (Gibson & Prien, 1977)
- Educational attainment has been utilized as a variable for predicting ones ability to acquire new competencies necessary to perform the job (Prien & Hughes, 2004)

Disadvantages of Using Traditional MQs

- Highly subjective
 - Requires judgments of analysts
- Relies on the applicant's writing ability
 - Applicant's ability to clearly explain their past experiences

Importance of Adopting Content Valid MQs

- Supreme Court Cases
 - *Connecticut v. Teal* (1982)
 - Subjective tests are subjected to adverse impact calculations
 - Organizations must be able to defend each step of their selection procedure even when the bottom-line does not have adverse impact
 - *Watson v. Fort Worth Bank and Trust* (1988)
 - Required that selection step with adverse impact be isolated



Levine, Maye, Ulm & Gordon, (1997)

- Content valid MQs developed in response to court case for 36 jobs that had adverse impact against Blacks
- Procedure completed on 14 hospital jobs
- Results were mixed (i.e., reduction in adverse impact for 6 of 14 jobs and an increase in adverse impact for 8 of 14 jobs)



Example MQs

- Traditional MQ
 - High school diploma or GED
 - 1 year of experience in inventory and storekeeping control
- Content Valid MQ
 - Experience or education using basic math skills such as adding, subtracting, multiplying and dividing
 - Experience in counting inventory and maintaining inventory supplies
 - Experience providing customer service to clients such as answering phones, providing information to others, etc.
 - Experience using modern office equipment such as a copier, telephone, calculator, computer printer, etc.

Content Valid Minimum Qualifications Used in This Study

- Reviewed KSAs important and needed at entry
- SMEs and analysts determined the KSAs used for MQs
- Wrote KSAs as behavioral statements
- Pilot tested final version of MQs on current incumbents
- Content valid MQs were developed with SMEs to provide legal defensibility



Hypotheses 1 & 2

- The content valid methodology produces less adverse impact at the application screening point than traditional minimum qualifications
- The content valid methodology produces higher passing rates at the application screening point than traditional minimum qualifications for professional job classes (i.e., accounting positions), but does not produce higher passing rates for non-professional job classes



Hypotheses 3 & 4

- Passing rates at the application screening point using the content valid methodology for promotional positions are higher than passing rates for open positions
- Applicants who meet the minimum qualifications using both minimum qualifications methodologies will have significantly higher overall selection scores than those applicants who only meet the content valid minimum qualifications



Method

PBJC

- Participants
 - 1955 applications of 12 jobs
 - 1281 Blacks, 651 Whites, 23 did not report race
 - 1409 females, 544 males, 2 did not report gender
 - 4 job families covered the 12 job classes
 - Promotional and open recruitments



Method

- Procedure
 - All applications were previously reviewed using the content valid minimum qualifications during the Spring of 2004
 - For this study, the same applications were reviewed using the Traditional MQs (i.e., education and experience)



Method

- 2 raters evaluated each application and made a preliminary determination of eligibility (i.e., eligible, not eligible or incomplete application)
- Consensus was required by the 2 raters for the final determinations
- All incomplete applications were eliminated from the data set



Method

- Inter-rater agreement was calculated for the preliminary ratings
- Overall correlation for all jobs combined was $r_{xx} = .75$



Results: Hypothesis 1

- H1 was supported for race using 4/5ths Rule
 - 6 of 12 jobs had adverse impact when screened using the traditional MQs
 - 3 had adverse impact against Blacks (Principal Court Clerk, Stores Clerk and Sr. Stores Clerk)
 - 3 had adverse impact against Whites (Accountant, Auditor, and Construction Supervisor)
 - 2 of the 12 jobs had adverse impact when screened using the content valid MQs
 - 2 had adverse impact against Whites (Administrative Asst. IV and Administrative Coordinator)



Results: Hypothesis 1

- H1 was supported for race using Chi-square
 - 4 of 12 jobs had adverse impact when screened using the traditional MQs
 - 2 had adverse impact against Blacks (Stores Clerk and Sr. Stores Clerk)
 - 2 had adverse impact against Whites (Accountant and Auditor)
 - 2 of the 12 jobs had adverse impact when screened using the content valid MQs
 - 2 had adverse impact against Blacks (Administrative Asst. IV and Administrative Coordinator)



Results: Hypothesis 1

- **H1 was supported for gender using 4/5ths Rule**
 - 8 of 12 jobs had adverse impact when screened using the traditional MQs
 - 7 had adverse impact against females (Accountant, Sr. Accountant, Auditor, Principal Court Clerk, Public Works Supervisor, Construction Supervisor and Stores Clerk)
 - 1 had adverse impact against males (Community Resource Representative)
 - 3 of the 12 jobs had adverse impact when screened using the content valid MQs
 - 2 had adverse impact against females (Principal Court Clerk and Labor Supervisor)
 - 1 had adverse impact against males (Administrative Coordinator)



Results: Hypothesis 1

- H1 was supported for gender using Chi-square
 - 5 of 12 jobs had adverse impact when screened using the traditional MQs
 - 5 had adverse impact against females (Accountant, Sr. Accountant, Auditor, Public Works Supervisor, and Stores Clerk)
 - 1 of the 12 jobs had adverse impact when screened using the content valid MQs
 - 1 had adverse impact against females (Administrative Coordinator)



Results: Hypothesis 2

- H2 was not clearly supported for race
 - Traditional MQs resulted in adverse impact for professional job family and other job family
 - Content valid MQs resulted in adverse impact only for the clerical job family
 - Results were the same when considering chi-square



Results: Hypothesis 2

- H2 was not clearly supported for gender
 - Traditional MQs resulted in adverse impact for all four job families
 - Content valid MQs resulted in adverse impact only for the clerical job family (against males)
 - When considering chi-square for the traditional MQs only the professional and other job families had adverse impact
 - When considering chi-square for the content valid MQs, no adverse impact was found



Results: Hypothesis 3

- **H3 was partially supported for race**
 - Pass rates did increase from the traditional MQ screen to the content valid MQ screen
 - Adverse impact using 4/5ths rule did not change from MQ method
 - Chi-square indicated adverse impact for promotional positions for both MQ methodologies



Results: Hypothesis 3

- **H3 was supported for gender**
 - Pass rates did increase from the traditional MQ screen to the content valid MQ screen
 - Adverse impact using 4/5ths rule and chi-square did improve from traditional MQs to content valid MQs



Results: Hypothesis 3

- **H4 was supported**
 - Applicants who passed both the traditional and content valid minimum qualifications had significantly higher z-scores ($M = .12$, $SD = 1.01$) than those applicants who met only the content valid minimum qualifications ($M = -.13$, $SD = .99$), $t(1015) = -3.99$, $p = .00$ (two-tailed), $d = .25$



Implications

- Content valid MQs reduce adverse impact for race and gender
- Content valid MQs increased pass ratios for all applicants
- Content valid MQs are better at identifying the barely acceptable applicant
- Applicants who passed both MQ screen methodologies, performed better on the subsequent test



Study Limitations

- Same applications evaluated using two types of MQs
- Gender composition of some jobs was not equally distributed
- Race composition was not equally distributed for all jobs, but not as bad as gender
- Large no show rate for subsequent testing
 - 1549 invited to take the tests
 - 532 applicants across 12 jobs **did not show**



Future Research

- Determine the impact that content valid MQs have on a multi-stage selection system
- Have applicants submit applications specific to both types of MQ methodologies
- Investigate characteristics for both types of MQs – ease of verification, identify barely qualified applicant, flexibility, and clarity
- Applicant perceptions about the past use of traditional MQs and the adoption of the new content valid MQs



Questions?????

Personnel Board of
Jefferson County

Adopting Content Valid Minimum Qualifications Reduces Adverse Impact, But Decreases Applicant Test Performance

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Minimum qualifications screens are used by many organizations; however the sophistication level of these minimum qualifications varies. This study investigated the use of a new content valid minimum qualification development methodology and its influence on adverse impact for 1955 applicants for 12 different jobs. This study investigated adverse impact ratios for a variety of jobs by comparing applications using traditional minimum qualifications (i.e., educational attainment and years of relevant experience) and content valid minimum qualifications. The results indicated that the content valid minimum qualifications reduced adverse impact and increased pass ratios of the application screen for both race and sex. The study also indicated that applicants who passed only the content valid minimum qualifications screen scored lower on subsequent tests. Implications and future research suggestions are presented.

Adverse impact has long been an issue of concern for test developers and hiring agencies. However, this concern primarily focuses on second stage selection components and greatly ignores the stage at which these group differences start. The first step in nearly all selection procedures is the evaluation of a resume or application (i.e., a review of the applicant's minimum qualifications). Judgments are made about the qualifications for each applicant based on the information contained in their application materials (e.g., resumes, transcripts, applications, etc.). For government agencies, this is the stage at which individuals are determined to possess the bare minimum qualifications to perform the specified job duties, in other words, applicants are evaluated to determine if they are eligible for further testing.

Historically, minimum qualifications have been largely ignored by researchers with relatively few studies being published on the topic. In fact, a majority of published studies date back to the 1970's and 1980's (Gibson & Prien, 1977; Meritt-Hatson & Wexley, 1983). This is unfortunate given that many public sector agencies heavily utilize minimum qualifications. Specifically, many public sector agencies evaluate the eligibility of applicants to move on to further stages in the selection process by relying on reviews of years of relevant experience and educational attainment. This allows organizations to quickly screen out those applicants who are

obviously unfit for the positions (Seberhagen, 1996). In addition, educational attainment has generally been utilized as a variable for predicting an applicant's ability to acquire new competencies necessary to perform the job duties based on their prior educational performance (Prien & Hughes, 2004).

Recently, some research has been published showing that the public sector is changing how minimum qualifications are developed (Buster, Roth, & Bobko, 2005; Levine, Maye, Ulm, & Gordon, 1997; Prien & Hughes, 2004). Specifically, in some agencies content valid methodologies are being utilized to develop minimum qualifications to ensure that the initial screening of applicants is valid. The validity of minimum qualifications is an important stage to analyze in the selection process because if you have adverse impact or group differences in this initial stage, it may compound group differences in later selection stages. More importantly, *Connecticut v. Teal* (1982) indicated that organizations must be able to defend each step of a selection procedure (including minimum qualifications screens) even when the bottom-line does not show adverse impact (Gutman, 2004). Previously, minimum qualifications were excluded from disparate impact cases due to their subjectivity; however, the Supreme Court's decision in *Watson v. Fort Worth Bank* (1988), allowed subjective decisions to be analyzed via disparate impact (Bersoff, 1988).

These new content valid minimum qualifications development methodologies should strongly be considered by all organizations. As presented by Meritt-Haston and Wexley (1983) during their review of relevant court cases, defendants (i.e., organizations) were most likely to win if they were able to establish validity of their educational requirements.

But the question still remains; do content valid minimum qualifications reduce adverse impact? This is a question that few researchers have investigated, but those who have found mixed results (Buster et al., 2005; Levine et. al., 1997). Researchers and practitioners have painstakingly detailed how they developed their minimum qualifications to ensure that they were in fact content valid, but only one empirical investigation on the effects of their use across a variety of jobs has been published (Levine et. al., 1997). The purpose of this study is to further investigate this important question.

This study investigated adverse impact ratios for a variety of jobs by comparing those deemed qualified using traditional minimum qualifications (i.e., educational attainment and years of relevant experience) and those applicants deemed qualified utilizing content valid minimum qualifications. The data included 1955 applications for a variety of jobs including professional level jobs (e.g., Accounting), clerical jobs (e.g., Administrative Assistants), skilled jobs (e.g., Public Works), and other non-categorized jobs.

The central research questions explored in this study included: (1) Do content valid minimum qualifications result in adverse impact? (2) Do selection ratios using traditional minimum qualifications differ from selection ratios determined by content valid minimum qualifications? (3) What are the effects of job type and recruitment method on these selection ratios? (4) Do applicants who meet both traditional minimum qualifications and content valid minimum qualifications perform better on subsequent selection devices? Findings are presented and implications for practical use are discussed.

Minimum Qualifications

Definition of Minimum Qualifications

All organizations, public or private, engage in personnel selection. The sophistication of these selection systems varies considerably from a simple resume screening to a multiple hurdle approach which may involve an application screening, written test, personality test, a structured interview, a physical ability test or any combination of professionally acceptable selection measures.

Although the sophistication level of these systems varies, most systems include at least a basic qualification screen of some form such as an application, resume, or minimum qualification screen. Specifically, governmental agencies rely heavily on the development and utilization of minimum qualifications screens (Levine et al., 1997; Schwartz, 1977)

A minimum qualification is “a statement of the minimum level of competence the individual must have for a job” (Gibson & Prien, 1977, p. 447). Levine et al. (1997, p.1009) offer a more comprehensive definition of minimum qualifications as “statements of education, experiences and/or closely related personal attributes needed to perform a job satisfactorily, that are used as standards to screen applicants”. Minimum qualifications are often the first step for selection procedures that involve multiple testing stages. Since minimum qualifications are the initial step in the selection process, they impact the entire selection process (Levine et al., 1997). The main purpose of the minimum qualifications process is to screen out those applicants who are obviously unfit for the job while screening in those applicants who can perform the job at a minimally acceptable level. Therefore, if an applicant does not possess the minimum qualifications outlined as required for the job, they are generally deemed as unqualified for the position and are not invited to participate in any additional selection tests (Levine et al., 1997).

Use of Traditional Minimum Qualifications

Traditional minimum qualifications are the most common form of application screening utilized by organizations. Traditional minimum qualifications are generally presented in the form of required education and years of experience (Seberhagen, 2000). For instance, a job announcement for an accountant may specify a requirement of a Bachelor's degree in accounting or related field and three years of accounting experience. Some organizations may give credit or exchange additional education or years of experience to make-up for deficiencies in the other sections (e.g., a Master's degree in accounting with only one year of experience may be considered equivalent to the above example; Levine et al., 1997). The underlying reason for utilizing these types of minimum qualifications is the assumption that requiring education or years of experience will have produced proficient levels of the knowledge, skills, and abilities required to perform the job (Gibson & Prien, 1977). Specifically, educational attainment has generally been utilized as a variable for predicting an applicant's ability to acquire new

competencies necessary to perform the job duties (Prien & Hughes, 2004).

Unfortunately, one disadvantage of utilizing the traditional minimum qualifications is that they can be highly subjective screens. In many cases the individuals reviewing the application may not be able to determine if the applicant has satisfactorily met the minimum qualifications. For instance, using the above example of an accountant, it is not uncommon for a degree in a related field (e.g., mathematics) to be substituted for the degree major desired (i.e., accounting). However, determining which degree majors qualify as a related field of study can be highly subjective. In addition, even degrees for the same major course of study may vary from school to school unless the programs are accredited.

Historically there are four reasons that public sector agencies have used minimum qualifications as their initial screen. These reasons are administrative, perceived fairness, tradition, and for setting pay. It is common for public sector agencies to receive several hundred applications for many of their positions. Administratively this is a large volume of applications to handle and administer subsequent testing components. As such, minimum qualifications are used to reduce the number of applicants proceeding to more administratively burdensome tests.

The second reason for the use of traditional minimum qualifications is perceived fairness for the applicants. By utilizing the traditional minimum qualifications that outline the degrees or education and years of experience required to make it past the first hurdle, applicants may know whether they will meet those minimum qualifications. This increases the applicants' perception of fairness because they know in advance what criteria they need to meet in order to pass the initial screening step (Abrams, Johnson, Sproule & Ash, 2002).

The third reason for the use of minimum qualifications is tradition. For decades public sector agencies have been using traditional minimum qualifications for their initial testing screens (Schwartz, 1977). These traditional minimum qualifications are generally documented on public documents, such as position descriptions and job specifications (Abrams et al., 2002).

The final reason for the use of traditional minimum qualifications is for setting pay. Specifically, traditional minimum qualifications specify the level of education and experience acquired by the typical employee upon entering into the position. These qualifications are then used to determine the appropriate compensation level of the job.

Importance of Adopting Content Valid Methods

Legal Precedence

Although traditional minimum qualifications are frequently used by organizations as initial screening devices, there is typically little, if any, evidence to support their use in this manner. The lack of validity evidence for traditional minimum qualifications increases the importance of identifying methodologies for validating minimum qualifications.

One driving force in the necessity to create content valid minimum qualifications can be linked to recent Supreme Court cases like *Connecticut v. Teal* (1982), *Watson v. Fort Worth Bank and Trust* (1988), and *Lanning v. South Eastern Pennsylvania Transportation Authority* (2002). Specifically, decisions made in each of these cases have changed how minimum qualifications are viewed by the courts and have opened up many agencies to potential litigation.

Connecticut v. Teal (1982) indicated that we must be able to defend each step of a selection procedure (including minimum qualifications screens) even when the bottom-line does not show adverse impact (Cascio, 1998; Gutman, 2004). Previously, minimum qualifications were excluded from disparate impact cases due to their subjectivity; however, the Supreme Court's decision in *Watson v. Fort Worth Bank and Trust* (1988), allowed subjective decisions to be analyzed via disparate impact (Bersoff, 1988).

In *Watson v. Fort Worth Bank and Trust* (1988) the Supreme Court also created guidelines for proving and defending Title VII disparate impact cases. The first and most relevant guideline was that when an organization's entire selection process results in adverse impact, the selection procedure(s) which contributed to the adverse impact must be isolated (Bersoff, 1988). This was a substantial change from the past. Previously only standardized tests were subjected to adverse impact analyses and selection stages such as minimum qualifications screens were safeguarded from court scrutiny. Now with the Supreme Court's decision to allow subjective measures to be scrutinized, organizations must ensure that all stages of selection devices, especially minimum qualifications screens, are free of adverse impact and are content valid.

Finally, in the case of *Lanning v. South Eastern Pennsylvania Transportation Authority (SEPTA)*; 1999), the question of how an organization can establish business necessity was the main focus of the case. This brought into question how the courts would define "minimum qualifications necessary".

The District Court had ultimately defined “minimum qualifications necessary” as the applicant who could meet the minimum qualifications was likely to be able to perform the job (Sharf, 2003). This definition made by the courts supports the necessity of validation of the minimum qualifications along with *Watson v. Fort Worth Bank and Trust* (1988) and *Connecticut v. Teal* (1982).

An Adopted Development Methodology

One published content valid minimum qualifications development methodology is that developed by Levine, Maye, Ulm, and Gordon (1997). This methodology creates profiles for applicants in order to be deemed as minimally qualified for the position. Minimum qualifications profiles are brief descriptions of the types of education and experience that are required to perform at a minimally acceptable level on the job.

The methodology was developed using 14 Georgia State jobs within a hospital setting. A complete job analysis subsequently followed by a content valid minimum qualifications development procedure was completed on all 14 hospital jobs. Tasks, knowledge, skills and abilities were developed and subjected to rating scales that determined their impact and relevance to establishing minimum qualifications. All personality and character attributes were removed from the job analysis (Levine et al., 1997). Levine et al. (1997) had two key purposes for the job analysis process. First, it was important to establish a basis on which minimum qualifications could be derived. Second, once the minimum qualifications were developed, there needed to be a domain in which they could be evaluated for content validity. These domains were used to draft the minimum qualifications profiles.

Several profiles were developed for each job and then a panel of SMEs was gathered to review and evaluate the profiles. The SMEs were first asked to identify the profiles that described a barely acceptable employee. Once these were identified, the list of profiles was reviewed for completeness and determined if any needed to be revised. Once the profiles were finalized, they were evaluated on two rating scales: level and clarity. The profiles that met the criteria for these two scales were then linked back to the tasks and KSAs. All profiles that met the criteria for linkage were then retained as the new content valid minimum qualifications.

Levine’s study not only focused on the development of content valid minimum qualifications, but also whether they produced adverse impact for race. Levine et al. (1997) investigated applications from the previous

recruitments of 14 jobs at a Georgia state hospital. The newly developed minimum qualifications were applied to applications that were collected under the former or traditional minimum qualifications. Hence, the old applications were screened using both the traditional minimum qualifications and the new content valid minimum qualifications. Then selection ratios for race were calculated and adverse impact was determined. The results of Levine et al. (1997) indicated that the newer content valid minimum qualifications were not always successful in reducing adverse impact as defined using the four-fifths rule. In fact, there was a reduction in adverse impact for six of the fourteen jobs, but an increase in adverse impact for the remaining eight jobs.

Quantity Versus Quality of Experience

One reason that may have contributed to the mixed results found by the Levine et al. (1997) study is that they relied on what are referred to as minimum qualifications profiles. For instance, as published in their study, the position of Pharmacy Technician had traditional minimum qualifications of “two years of experience in assisting a registered pharmacist in the compounding and dispensing of prescriptions” (Levine et al., 1997, p. 1016). Two of the six revised minimum qualification profiles were (1) “Eighteen months of experience assisting a pharmacist in a non-hospital setting. Such duties include maintaining patient medication records; setting-up, packaging and labeling medication doses; and maintaining inventories of drugs and supplies” or (2) “Completion of a Pharmacy Technician technical school program which provided at least 600 clock hours or 15 weeks of classroom training AND an internship in a pharmacy” (Levine et al., 1997, p. 1016). These minimum qualifications profiles were all interchangeable and allowed an applicant to meet the minimum requirement of the job in multiple ways. They all had time constraints (e.g., eighteen months, nine months, 600 clock hours, etc.) on the amount of experience required in order to successfully meet that minimum requirement. Also they required the employing agency to subjectively determine if the information provided by the applicant qualified them as meeting the minimum qualifications.

The main goal of the current methodology was to produce content valid minimum qualifications while attempting to reduce adverse impact at the minimum qualifications screening stage as well as the entire selection process.

One difference between the minimum qualifications utilized in this study and the Levine et al. (1997) content valid minimum qualifications is that Levine’s study still specifies a time limit or

minimum time requirement to meet any one of the appropriate profiles. In contrast, the minimum qualifications development methodology used in this study never specifies a time requirement. In other words, the content valid minimum qualifications methodology strictly concentrates on the quality of an applicant's experience, not the quantity. The Equal Employment Opportunity Commission's (EEOC) *Uniform Guideline son Employee Selection Procedures* (1978) states the importance of having a resemblance between the tasks and KSAs of the job and those specific behaviors and KSAs in the applicant's experience. However there is no emphasis of a specific time requirement for relevant job experience in order to meet the KSAs.

A meta-analysis conducted by Quiñones, Ford and Teachout (1995) examined the measurement of experience in several ways. The results of their study indicated that the relationship between performance and experience was moderated by work experience measured as an amount, by time and by type of experience. The amount of experience was defined as numerical counts (i.e., the number of times a particular task was performed). Experience measured by time was defined as tenure (e.g., five years of clerical experience). Finally the category of experience type was defined as the types of tasks performed (e.g., counting supplies). The results of the meta-analysis indicated that the strongest relationship with performance was when work experience was measured as an amount followed by time and then type.

In addition, the Quiñones et al. (1995) study also investigated the relationship of performance and work experience defined in terms of specificity level. Work experience was broken down into three levels of specificity; task, job, and organization. The results of the meta-analysis indicated that the relationship between experience and performance was the strongest at the task level, then job level and finally organizational level of specificity.

For the current study, work experience is more discreetly classified as type of work experience and the level of specificity as task level. This differs from the Levine study in that it removes the time requirement as well as any overlap between two or more definitions/categorizations of work experience.

Study Design and Analyses

In order to answer the previously presented research questions, the current study used the same procedure as Levine et al. (1997). That is, this study reviewed the same applications using both the traditional minimum qualifications developed for the job classes as well as newly developed content valid

minimum qualifications. However, one difference between the procedures used in this and the Levine et al. (1997) study is that the Levine et al. study used applications for jobs where the applicants described their qualifications in response to announcements containing the traditional minimum qualifications. Then they used the content valid minimum qualifications as the qualifying criteria to determine the applicants' eligibility. The reverse order was utilized for the current study. Applicants submitted application materials in response to job announcements that listed only the content valid minimum qualifications for those jobs. These same applications were then reviewed again using the traditional minimum qualifications that had been historically used by the organization as the qualifying criteria.

The Levine et al. (1997) study investigated adverse impact for race using the four-fifths rule. The study did not examine adverse impact using any other analyses nor did they consider adverse impact for sex. In contrast, the current study investigated adverse impact using the four-fifths rule as well as chi-square analyses. In addition, the current study investigated adverse impact for both race and sex, as well as investigated various other variables that may influence the selection ratios. For instance, one variable considered was job type (i.e., professional, clerical, skilled labor, etc.). A second variable investigated by this study was recruitment method. That is, jobs were assigned to two groups based on method of recruitment, either promotional recruitment (i.e., only applicants currently employed in the system were allowed to apply) or open recruitment (i.e., anyone interested in the job was allowed to apply).

Hypotheses

The main purpose of this study was to investigate the impact of using a content valid minimum qualifications development methodology on passing rates and adverse impact compared with traditional minimum qualifications.

Hypothesis 1: The content valid methodology produces less adverse impact at the application screening point than traditional minimum qualification requirements for all positions?

Hypothesis 2: The content valid methodology produces higher passing rates at the application screening point than traditional minimum qualifications requirements for professional job classes (i.e., Accountant, Senior Accountant, and Auditor), but does not produce higher passing rates for the non-professional job classes.

Hypothesis 3: Passing rates at the application screening point using the content valid methodology for promotional positions are higher than passing rates for open positions.

The new content valid minimum qualifications were developed to assess whether an applicant possessed the required KSAs for performing the job successfully. Although an applicant had to demonstrate that they possessed the KSAs, they were not required to have specific tenure (i.e., years of experience) in a position. In other words, using the content valid methodology, an applicant with one year of project management experience and another applicant with one month of the same project management experience were both deemed as eligible (i.e., meeting the minimum qualifications) to sit for the subsequent exam. This led to a candidate pool of individuals taking subsequent testing procedures that had a large range of experience performing tasks that allowed them to possess the requisite KSAs. Knowing that the test was job related and based on information gathered from incumbents of the job, there was the potential that the test content, although job related, would be more difficult for an individual with fewer years of experience. Given this assumption, the following hypothesis was proposed:

Hypothesis 4: Applicants who meet the minimum qualifications using both minimum qualifications methodologies (the content valid and traditional methodologies) will have significantly higher overall selection scores than those applicants who only meet the content valid minimum qualifications.

Method

Participants

The participants consisted of applicants who applied for a variety of jobs within a public sector merit system located in the southeastern United States. The jobs were all announced during the spring of 2004. Content valid minimum qualifications were utilized to determine the applicants' eligibility to participate in further testing.

The total sample size included 1955 applications across 12 jobs. A total of 1281 (66%) applicants were Black, 651 (33%) were White, and 23 (1%) indicated other minority group (i.e., Asian, Native American, Hispanic, etc.) membership. The sex composition of the entire sample was 72% (n = 1409) female, 28% (n = 544) male, and two applicants who did not indicate their sex.

Job Class Variables

Job Families

The jobs to which the applicants applied were grouped into four different job categories; professional (i.e., Accountant, Senior Accountant, and Auditor), clerical (i.e., Administrative Assistant IV, Administrative Coordinator, and Principal Court Clerk), skilled labor (i.e., Public Works Supervisor, Construction Supervisor, and Labor Supervisor) and other jobs (i.e., Stores Clerk, Senior Stores Clerk, and Community Resource Representative).

Open Versus Promotional Jobs

Some of the jobs utilized in the study were recruited as open positions and others were recruited as promotional only. Half of the jobs utilized for this study were open positions. These jobs included all three of the accounting positions (i.e., Accountant, Senior Accountant, and Auditor), Community Resource Representative, Stores Clerk and Senior Stores Clerk. The remaining six positions were recruited as promotional; meaning that applicants had to be employed within the merit system.

Procedure

All positions included in this study were previously reviewed utilizing the content valid minimum qualifications. Two independent job analysts carefully reviewed each application to determine if the applicant successfully met all content valid minimum qualifications. A different pair of job analysts reviewed all completed applications a second time using the traditional minimum qualifications methodology. Data were collected as overall pass/fail of the minimum qualifications.

Results

The first hypothesis, which predicted that the content valid minimum qualifications method would result in lower adverse impact ratios than the traditional minimum qualifications of education and experience, was overwhelmingly supported. As presented in Table 1, the results indicated that when considering race, six of the 12 jobs (Accountant, Auditor, Principal Court Clerk, Construction Supervisor, Stores Clerk and Senior Stores Clerk) resulted in adverse impact when using the four-fifths rule for the traditional minimum qualifications method. Of these six jobs, three resulted in adverse impact against Whites (Accountant, Auditor, and

Construction Supervisor) while the remaining three adversely impacted Blacks. Conversely, when using content valid minimum qualifications, only two of the 12 jobs (Administrative Assistant IV and Administrative Coordinator) resulted in adverse impact (both jobs against Blacks).

The results for sex also indicated a reduction in adverse impact. As presented in Table 2, the traditional minimum qualifications produced adverse impact in eight of the 12 jobs (with one of the eight having adverse impact against males, Community Resource Representative) whereas the content valid minimum qualifications produced adverse impact using the four-fifths measure in only three of the 12 jobs (with one resulting in adverse impact against males, Administrative Coordinator).

Similar results were found for the chi-square analyses. For race, the traditional minimum qualifications produced adverse impact in four of 12 jobs (Accountant, Auditor, Stores Clerk, and Senior Stores Clerk) and the content valid minimum qualifications produced adverse impact in only two of 12 jobs (Administrative Assistant IV and Administrative Coordinator). For sex the results were slightly different. There was a significant chi-square ($p < .05$) for five of 12 jobs (Accountant, Senior Accountant, Auditor, Public Works Supervisor, and Stores Clerk) when using the traditional minimum qualifications. When using the content valid minimum qualifications, only one of 12 jobs had adverse impact (Administrative Assistant IV). Tables 1 and 2 show the pass ratios, adverse impact ratios and chi-square results for both race (Table 1) and sex (Table 2).

The second hypothesis predicted that for accounting positions the minority passing rates using the content valid minimum qualifications screen would be higher than the passing rates using the traditional minimum qualifications screen. Hypothesis 2 was not clearly supported. For race, the results indicated that the traditional minimum qualifications methodology resulted in lower passing rates for minorities (i.e., Blacks and females) than the content valid minimum qualifications, but the same occurred for the other job families as well. These results indicated that in general for the professional job family the passing rates were lower for minorities using the traditional minimum qualifications than when using the content valid minimum qualifications. Tables 3 and 4 show the pass ratios, adverse impact ratios and chi-squares for both race (Table 3) and sex (Table 4).

When looking at the adverse impact ratios of Blacks for the jobs grouped by family, the traditional minimum qualifications screen resulted in adverse impact for two of the four job families (i.e.,

professional and other), whereas the content valid methodology resulted in adverse impact for only one of the four job families (i.e., clerical). When calculating chi-square for race by job family, the results were the same. That is, using the traditional minimum qualifications the professional job family and other job family had chi-squares of $\chi^2(1, N = 450) = 23.52, p < .01$ and $\chi^2(1, N = 540) = 19.07, p < .01$, respectively. The content valid minimum qualifications also had the same results when calculating chi-square for race, $\chi^2(1, N = 638) = 23.12, p < .01$ for the clerical job family.

Sex was also considered in the adverse impact analyses. The results showed that adverse impact was present for the traditional minimum qualifications for both four-fifths and chi-square for the professional ($\chi^2(1, N = 451) = 37.37, p < .01$) and other job families ($\chi^2(1, N = 554) = 10.32, p < .01$). The results also indicated that when using only the four-fifths calculation, the traditional minimum qualifications for the clerical and skilled labor job families had adverse impact. The results for the content valid minimum qualifications for sex were somewhat different. Specifically, the results indicated that when using the four-fifths rule, there was adverse impact against males for the clerical jobs; however, when considering the chi-square analyses the results indicated that no adverse impact was found for any job family.

Hypothesis 3 predicted that the selection ratios for the content valid minimum qualifications would be higher for the promotional positions than the passing rates of the open positions. This question was partially supported. The selection ratios using the content valid minimum qualifications for the promotional positions did increase over the traditional minimum qualifications for both race and sex. However, an increase also occurred for the open competitive positions. For race, the selection ratio only changed 2% by minimum qualifications methodology (i.e., traditional = .80 and content valid = .82). When considering sex, adverse impact was eliminated for both the promotional (adverse impact ratio from .62 to .86) and the open positions (adverse impact ratio from .63 to .99). However, chi-square was significant at $\chi^2(1, N = 947) = 45.45, p < .01$ for traditional minimum qualifications and $\chi^2(1, N = 947) = 10.17, p < .01$ for content valid minimum qualifications for promotional jobs. The chi-square for open competitive jobs was also significant at $\chi^2(1, N = 1006) = 31.76, p < .01$ for traditional minimum qualifications. Tables 5 and 6 show the pass ratios, adverse impact ratios and chi-squares for both race (Table 5) and sex (Table 6).

Hypothesis 4 predicted that applicants who met the minimum qualifications using both minimum

qualifications methodologies (the content valid methodology and experience and education) would have higher overall selection test scores than those applicants who only met the content valid minimum qualifications. As predicted, the applicants who passed both the traditional and content valid minimum qualifications had significantly higher overall test z-scores ($M = .12$, $SD = 1.01$) than those applicants who met only the content valid minimum qualifications ($M = -.13$, $SD = .99$), $t(1015) = -3.99$, $p < .01$ (two-tailed), $d = .25$.

Discussion

Implications

As indicated in Table 1, the results of this study were clear. It is evident that the use of legally defensible content valid minimum qualifications does reduce adverse impact for both race and sex. These results contribute to the literature in that it is important to know that the content valid minimum qualifications did reduce, or in some cases eliminate, adverse impact for the jobs studied. This in conjunction with Levine et al. (1997) does indicate that when developed properly content valid minimum qualifications are an effective method for developing minimum qualifications and potentially eliminating or reducing adverse impact.

As shown in Table 1, the traditional minimum qualifications produced adverse impact in six of the 12 jobs. However, the content valid minimum qualifications produced adverse impact for only two out of 12 jobs. The two jobs that had adverse impact for the content valid minimum qualifications had ratios of .75 and .77 indicating that the pass ratios were close to eliminating adverse impact on these two jobs. Conversely, for the jobs that resulted in adverse impact using traditional minimum qualifications, the ratios ranged from .41 to .68 indicating that these pass ratios were much further from approaching acceptable levels of adverse impact.

The results for sex were similar to those found for race. Specifically, eight of 11 jobs had adverse impact when using the traditional minimum qualifications (adverse impact could not be computed for Construction Supervisor). Of those eight jobs, seven had adverse impact against females with one having adverse impact against males. When considering adverse impact for the content valid minimum qualifications three of 11 jobs had adverse impact (adverse impact could not be computed for Administrative Assistant IV). Out of those three, one job had adverse impact against males. As with race, the range of adverse impact ratios for the traditional

minimum qualifications was much broader (e.g., .35 - .67) indicating that a large change was needed in the pass ratios in order for adverse impact to be eliminated. For the content valid minimum qualifications the range of adverse impact ratios was greater, but the extremes of the range were higher (e.g., .43 - .78) indicating that with a small change in pass ratios, adverse impact may have been eliminated for at least one of these positions.

The data indicated that the content valid minimum qualifications method may be more reliable at screening in those candidates who do possess the minimum requirements necessary to perform the job at the barely acceptable level. Using the traditional minimum qualifications, many of these individuals were being screened out due to unnecessarily stringent minimum qualifications.

When evaluating adverse impact by grouping the positions into job families and then by recruitment method, no profound results were evident. The results were consistent with those of each position. For race, less adverse impact was found for the content valid minimum qualifications than was found for the traditional minimum qualifications. Only the clerical job family resulted in adverse impact for the content valid minimum qualifications, whereas the traditional minimum qualifications for this job family did not have adverse impact. The pass ratios also improved from the traditional minimum qualifications to the use of content valid minimum qualifications. The results for sex are more convincing.

The traditional minimum qualifications resulted in adverse impact for all four job families, whereas the content valid minimum qualifications only had adverse impact for the clerical job family and the adverse impact was against males. The pass ratios improved when content valid minimum qualifications were utilized except for the clerical family. This was the only situation for sex (both males and females) where a pass ratio decreased, and in this case the pass ratio for males decreased when content valid minimum qualifications were used.

Considering recruitment type for race, there was little change between the adverse impact ratios of the traditional minimum qualifications and the content valid minimum qualifications, but there was a change in pass rates for Whites and Blacks. Specifically, the pass ratios increased from traditional minimum qualifications to content valid minimum qualifications for both races. An improvement was more noticeable for sex. The traditional minimum qualifications resulted in adverse impact for both recruitment types and were eliminated for both promotional and open recruitments when content valid minimum qualifications were used. As with

race, the pass ratios for both males and females also increased from traditional to content valid minimum qualifications.

Another question this study investigated was if the applicants who possessed the required experiences for both minimum qualifications types would perform better on the selection tests. This was investigated by using the unit weighted z-scores for all 12 jobs. The applicants were divided into two groups; those who only passed the content valid minimum qualifications and those who passed both the content valid and traditional minimum qualifications. The premise was that for someone to pass the traditional minimum qualifications, they had to have a specified number of years of job related experience. Given that the tests developed for all 12 jobs are content valid and highly representative of the jobs, additional years of job related experience should give applicants who met the traditional minimum qualifications the edge to score higher on the test. The results do support this premise. As predicted, the applicants who passed both the traditional and content valid minimum qualifications had significantly higher overall z-scores than those applicants who met only the content valid minimum qualifications. This significant mean difference is suggestive that content valid minimum qualifications better identify those applicants who possess the bare minimum requirements necessary to perform the job at an acceptable level. Instead, the use of traditional minimum qualifications is more practical for identifying those applicants who possess the preferred qualifications.

Adopting content valid minimum qualifications is crucial for public sector agencies since they are under the watchful eye of the general public. Public sector agencies are more aware of their legal responsibility to eliminate or reduce adverse impact at all stages of the selection process. This is true even though the law indicates that it is possible to have a selection system with adverse impact as long as it is valid and no other system with equal validity produces less adverse impact (Gutman, 1993). The adoption of a content valid minimum qualification development methodology brings these agencies one step closer to demonstrating that the entire selection system has evidence of content validity, hence decreasing their chances of litigation.

Study Limitations

As with any field study complications may be introduced when using real life data that cannot be manipulated or controlled. One limitation of this study was that the same applications were evaluated using two different types of minimum qualifications.

However, when the applicants applied, they only supplied detailed information directly related to the content valid minimum qualifications. Had the applicants provided detailed information that demonstrated possession of the traditional minimum qualifications, the pass ratios might be slightly different. This limitation is the complete opposite of the Levine et al. (1997) study where they evaluated applicants against the new content valid minimum qualifications by reviewing application materials submitted under the traditional minimum qualifications. As with the current study, unless you are able to have the applicants complete two applications for the same job using two sets of minimum qualifications, the true extent at which content valid minimum qualifications eliminate adverse impact will not be determined.

A second limitation of the study was the sex composition of some of the jobs. Specifically, the Administrative Assistant IV, Administrative Coordinator and Principal Court Clerk had very few, if any males apply and complete the testing process. The opposite was true for Public Works Supervisor, Construction Supervisor, and Labor Supervisor which had very few females apply. When you have such small numbers of a minority group included in the study, one person passing or failing can dramatically change your adverse impact ratios. In an ideal world, an equal number of males and females would apply for the positions along with an equal number of Blacks and Whites.

The third limitation of this study is the rate at which applicants did not complete the selection tests. Specifically, across the twelve jobs included in this study a total of 1955 applications were evaluated against the minimum qualifications. Of the 1955 applications, 1549 were eligible to take the subsequent tests, but test score information was only available on 1015 applicants. In other words, 532 applicants across twelve positions did not show to take the tests. Although some attrition is expected, as a researcher it is important to understand why these individuals choose not to come to take the test. For instance, if these applicants took the test, would the results for the mean differences have been different. Are the individuals that did not show to take the test the more qualified or less qualified applicants?

Future Research

There are several ways in which future research could contribute to the literature on minimum qualifications. First, determining the impact that content valid minimum qualifications have on a multi-stage selection system would be informative. For instance, the current study indicated that the

content valid minimum qualifications allow more individuals to pass the minimum qualifications screens. When subsequent testing methods are used (e.g., written job knowledge tests, work samples, interviews, etc.) does the higher pass rate at the minimum qualifications stage result in adverse impact at the bottom line?

An additional area for future research includes a comparison of content valid minimum qualifications and traditional minimum qualifications on a variety of characteristics. These characteristics may include flexibility of minimum qualifications, degree to which those who passed the minimum qualifications were qualified for the job, clarity of the minimum qualifications, and how easy it was to verify the applicant's possession of the minimum qualifications. Identification of differences for specific characteristics could potentially enhance current content valid methodologies being used and ensure that they do not result in adverse impact.

Finally, in the future it would be ideal to have applicants submit materials for the traditional minimum qualifications and then the content valid minimum qualifications separately. As with the Levine, et al. (1997) study, this current study had to rely on applications currently on file and then review them a second time using the appropriate method. All of these modifications and the suggestions for future research will provide answers about minimum qualifications and their use that have yet to be explored.

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Table 1

Adverse Impact Ratios for Race

Jobs	N	Adverse Impact											
		White		Black		Ratio		Chi-Square for Traditional MQs			Chi-Square for Content Valid MQs		
		Pass Rate	Trad.	Pass Rate	Trad.	CV	Trad.	CV	df	χ^2	p	df	χ^2
Accountant	224 (158)	.23	.95	.56	.97	.41*	.99*	1	20.37	.00	1	.26	.62
Senior Accountant	109 (68)	.49	.88	.54	.91	.90*	.96	1	.33	.57	1	.35	.55
Auditor	116 (85)	.26	.94	.58	.88	.45*	.94	1	9.22	.00	1	.69	.41
Administrative Assistant IV	341 (223)	.40	.82	.34	.61	.86	.75	1	1.11	.29	1	15.46	.00
Administrative Coordinator	133 (80)	.49	.92	.50	.71	.98*	.77	1	.01	.92	1	8.59	.00
Principal Court Clerk	164 (116)	.46	.48	.31	.42	.68	.88	1	3.25	.07	1	.44	.51
Public Works Supervisor	163 (77)	.63	.88	.51	.90	.81	.98*	1	2.44	.12	1	.06	.80
Construction Supervisor	34 (11)	.39	.87	.73	.82	.54*	.94	1	3.36	.07	1	.16	.69
Labor Supervisor	107 (41)	.73	.53	.71	.49	.97	.92	1	.05	.82	1	.18	.67
Community Resources Rep.	179 (151)	.14	.89	.15	.87	.94*	.98	1	.02	.90	1	.08	.78
Stores Clerk	240 (193)	.47	.94	.30	.87	.63	.93	1	5.11	.02	1	1.58	.21
Senior Stores Clerk	121 (77)	.73	.86	.47	.84	.64	.98	1	7.67	.01	1	.08	.77

Note: N = number of applications rated; the number in parentheses indicates the number of Black applications rated.

* indicates that adverse impact is against Whites.

Table 2

Adverse Impact Ratios for Sex

Jobs	N	Adverse Impact											
		Male Pass Rate		Female Pass Rate		Ratio		Chi-Square for Traditional MQs			Chi-Square for Content Valid MQs		
		Trad.	CV	Trad.	CV	Trad.	CV	df	χ^2	p	df	χ^2	p
Accountant	226 (185)	.76	.95	.40	.97	.53	.98*	1	17.11	.00	1	.26	.61
Senior Accountant	109 (81)	.86	.96	.41	.88	.48	.91	1	16.87	.00	1	1.73	.19
Auditor	116 (91)	.68	.88	.44	.90	.65	.98*	1	4.54	.03	1	.09	.76
Administrative Assistant IV	343 (340)	.33	.00	.36	.69	.93*	--	1	.01	.93	1	6.59	.01
Administrative Coordinator	135 (133)	.50	.50	.49	.80	.98	.63*	1	.00	.98	1	1.06	.30
Principal Court Clerk	165 (164)	1.00	1.00	.35	.43	.35	.43	1	1.86	.17	1	1.30	.25
Public Works Supervisor	164 (15)	.60	.89	.33	.87	.56	.97	1	3.88	.05	1	.09	.76
Construction Supervisor	34 (2)	.53	.84	.00	1.00	.00	.84*	1	2.13	.15	1	.367	.54
Labor Supervisor	106 (12)	.71	.53	.75	.42	.95*	.78	1	.07	.79	1	.57	.45
Community Resources Rep.	182 (150)	.09	.84	.17	.89	.56*	.95*	1	1.08	.30	1	.46	.50
Stores Clerk	250 (166)	.42	.86	.28	.89	.67	.97*	1	4.96	.03	1	.41	.52
Senior Stores Clerk	122 (69)	.60	.91	.52	.81	.86	.90	1	.82	.37	1	2.11	.15

Note: N = number of applications rated; the number in parentheses indicates the number of Female applications rated.

-- indicates that the ratio for this job was not computed.

* indicates that adverse impact is against males.

Table 3

Adverse Impact Ratios for Race by Job Family

Job Family	N	Adverse Impact												
		White		Black		Ratio	Chi-Square for Traditional MQs				Chi-Square for Content Valid MQs			
		Pass Rate	Trad.	Pass Rate	Trad.		CV	Trad.	CV	df	χ^2	p	df	χ^2
Professional	450 (312)	.31	.93	.56	.93	.56	.99	1	23.52	.00	1	.04	.84	
Clerical	638 (419)	.43	.77	.36	.58	.84	.75	1	3.06	.08	1	23.12	.00	
Skilled Labor	304 (129)	.63	.75	.59	.76	.93	.99*	1	.64	.42	1	.05	.82	
Other	540 (421)	.49	.90	.28	.87	.57	.96	1	19.07	.00	1	.87	.35	

Note: N = number of applications rated; the number in parentheses indicates the number of Black applications rated.

* indicates that adverse impact is against Whites.

Table 4

Adverse Impact Ratios for Sex by Job Family

Job Family	N	Adverse Impact												
		Male		Female		Ratio	Chi-Square for Traditional MQs				Chi-Square for Content Valid MQs			
		Pass Rate	Trad.	Pass Rate	Trad.		CV	Trad.	CV	df	χ^2	p	df	χ^2
Professional	452 (358)	.77	.94	.41	.93	.54	.99	1	37.37	.00	1	.04	.84	
Clerical	643 (637)	.50	.33	.38	.65	.77	.52*	1	.34	.56	1	2.55	.11	
Skilled Labor	304 (29)	.63	.76	.48	.69	.77	.90	1	2.37	.12	1	.78	.38	
Other	554 (385)	.41	.87	.28	.87	.67	1.00	1	10.03	.00	1	.01	.93	

Note: N = number of applications rated; the number in parentheses indicates the number of Female applications rated.

* indicates that adverse impact is against males.

Table 5

Adverse Impact Ratios for Race by Recruitment Method

Recruitment Method	N	Adverse Impact																	
		White				Black				Ratio				Chi-Square for Traditional MQs			Chi-Square for Content Valid MQs		
		Pass Rate		Pass Rate						df	χ^2	p	df	χ^2	p				
Promotional	942 (548)	.52	.76	.42	.62	.80	.82	1	10.52	.00	1	20.41	.00						
Open Competitive	990 (733)	.39	.91	.40	.89	.99*	.98	1	.01	.93	1	.80	.37						

Note: N = number of applications rated; the number in parentheses indicates the number of Black applications rated.

* indicates that adverse impact is against Whites.

Table 6

Adverse Impact Ratios for Sex by Recruitment Method

Recruitment Method	N	Adverse Impact																	
		Male				Female				Ratio				Chi-Square for Traditional MQs			Chi-Square for Content Valid MQs		
		Pass Rate		Pass Rate						df	χ^2	p	df	χ^2	p				
Promotional	947 (666)	.63	.75	.39	.65	.62	.86	1	45.45	.00	1	10.17	.00						
Open Competitive	1006 (743)	.54	.89	.34	.90	.63	.99	1	31.76	.00	1	.10	.75						

Note: N = number of applications rated; the number in parentheses indicates the number of Female applications rated.