

The Content Validity of the Community Mobility Assessment Tool for  
Individuals (CoMATI) in the context of the Cape Town Metropole

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## Declaration

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## Abstract

**Introduction:** The Community Mobility Assessment Tool for Individuals (CoMATI) is an occupational therapy assessment tool that evaluates an individual's ability to use public transport in the Cape Town metropole. The content of the CoMATI consists of an Interview Report Format and four assessment protocols for persons who ambulate, persons who use a wheeled device, persons with cognitive impairment and persons with visual impairment. As the psychometric properties of the CoMATI are not known, the purpose of the study was to establish the content validity of the CoMATI.

**Methodology:** A quantitative methodological approach was used. A panel of occupational therapists (N=5), considered to be subject matter experts (SMEs), were recruited on the basis of peer acknowledgement. The SMEs used a Content Validity Rating Scale to rate each item on the Interview Report Format and the four assessment protocols as *Essential*; *Useful but not essential* or *Not necessary* for evaluating performance of public transport use. Additional space was provided for feedback. A content validity ratio (CVR) was calculated for each item using the method described by Lawshe (1). To compensate for chance agreement, the researcher regarded a  $CVR_{critical} = 0,573$  to be the lowest level of CVR to indicate that the item may be considered relevant. A content validity index (CVI) was calculated in order to evaluate the degree to which the content in the Interview Report Format and each assessment protocol was representative of the domain of public transport. The CVI was calculated as the average agreement among SMEs. For a new instrument such as the CoMATI, the researcher was seeking 80% or better agreement.

**Results:** The Content Validity Rating Forms were completed by all SMEs and no items were omitted. There was total agreement from SMEs regarding the relevance of certain items. For those items where full agreement on relevance was not achieved, the items were considered to be *Useful but not essential* by only one of the five SMEs.

**Conclusion:** The results of the study determined that all items in the CoMATI had a high degree of content validity and may be considered to be relevant and representative to the domain of public transport use. Three reasons that certain items were considered less relevant than others may be that items may either not have been adequately performance based, may not have had the same degree of influence in excluding an individual from public transport use, or may not have been relevant to certain individuals. Occupational therapists using the present version of the CoMATI may have to rely on clinical reasoning to determine which of the available items are more relevant for an individual's performance of public transport use.

## Opsomming

Inleiding: Die Community Mobility Assessment Tool for Individuals (CoMATI) is 'n Arbeidsterapie bepalinginstrument wat 'n individu se vermoë om openbare vervoer in die Kaapse metropool te gebruik, evalueer. Die inhoud van die CoMATI bestaan uit 'n Onderhoud vorm en vier bepalingprotokolle vir persone wat kan loop (*ambulate*), persone wat 'n toestel met 'n wiel gebruik, persone met kognitiewe inkorting en persone met 'n visuele inkorting. Aangesien die psigometriese eienskappe van die CoMATI nie bekend is nie, was die doel van die studie om die inhoudsgeldigheid van die CoMATI te bepaal.

Metodologie: 'n Kwantitatiewe metodologiese benadering is gebruik. 'n Paneel van arbeidsterapeute (N = 5), wat beskou word as deskundiges, is gewerf op grond van eweknie-erkenning. Om die gebruik van openbare vervoer te evalueer, het die deskundiges 'n inhoudsgeldigheidskaal gebruik om elke item in die Onderhoud vorm en die vier bepalingprotokolle as *Noodsaaklik*, *Nuttig maar nie noodsaaklik nie* of *Nie nodig nie* te graadeer. Bykomende spasie is voorsien vir terugvoer. 'n Inhoudsgeldigheidsverhouding is bereken vir elke item volgens die metode wat Lawshe beskryf. Om te vergoed vir toevalooreenkoms, het die navorser 'n Inhoudsgeldigheidsverhouding<sub>kritiese</sub> = 0,573 beskou as die laagste vlak van Inhoudsgeldigheidsverhouding om aan te dui dat die item as toepaslik beskou kan word. 'n inhoudsgeldigheidsindeks is bereken om die mate waartoe die inhoud in die Onderhoud vorm en elke bepalingprotokol verteenwoordigend was van die domein van openbare vervoer, te evalueer. Die inhoudsgeldigheidsindeks is bereken as die gemiddelde ooreenkoms tussen die deskundiges. Vir 'n nuwe instrument soos die CoMATI, was die navorser op soek na 'n 80% of hoër ooreenkoms.

Resultate: Die Inhoudsgeldigheid beoordeling vorms is voltooi deur alle deskundiges en geen items is uitgelaat nie. Daar was totale ooreenkoms van deskundiges oor die toepaslikheid van sekere items. Vir die items waar die volle ooreenstemming oor die toepaslike nie bereik is nie, het slegs een van die vyf deskundigs die items beskou as *Nuttig maar nie noodsaaklik nie*.

Gevolgtrekking: Die resultate van die studie het bepaal dat alle items in die CoMATI 'n hoë graad van inhoudsgeldigheid het en kan beskou word as toepaslik en verteenwoordigend vir die domein van openbare vervoer gebruik. Drie redes waarom sekere items minder toepaslik beskou word as ander, is dat items waarskynlik nie genoegsaam gebaseer was op uitvoering nie; dit het nie dieselfde mate van invloed om 'n individu uit te sluit van openbare vervoer gebruik nie; of dit mag dalk nie vir sekere individue toepaslik wees nie. Arbeidsterapeute wat die huidige weergawe van die CoMATI gebruik, kan van kliniese beredenering gebruik maak om te bepaal watter van die beskikbare items meer toepaslik is vir die individu se gebruik van openbare vervoer.

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## Table of contents

Declaration .....	ii
Abstract .....	iii
Opsomming .....	iv
Acknowledgements.....	v
Table of contents .....	vi
List of tables.....	ix
List of figures .....	x
Definition of key terms .....	xi
Abbreviations.....	xiii
Chapter 1: Introduction.....	1
1.1 Background to the study.....	1
1.2 Problem statement.....	5
1.3 Purpose of the study .....	5
1.4 Research question .....	5
1.5 Research aim.....	6
1.6 Objectives .....	6
1.7 Rationale for the study .....	6
Chapter 2: Literature Review .....	9
2.1 Framing the occupation of public transport use .....	9
2.2 Occupation-based evaluation .....	10
2.3 Psychometric properties.....	11
2.4 Expert evaluation .....	13
2.5 Interviews in Occupational Therapy.....	14
2.6 Assessment of skills and abilities required for public transport use.....	16
2.6.1 Community mobility for persons who ambulate .....	16
2.6.2 Community mobility for persons who use a wheeled device .....	18
2.6.3 Community mobility for persons with cognitive impairment.....	21
2.6.4 Community mobility for persons with visual impairment.....	24
2.7 Conclusion .....	27
Chapter 3: Methodology .....	28
3.1 Introduction .....	28
3.2 The measurement instrument: CoMATI.....	28
3.3 Study design .....	31
3.4 Subject matter experts .....	32
3.5 Sampling and sample size.....	32

3.6	Data collection and procedure .....	33
3.7	The Content Validity Rating Scale .....	34
3.8	Data management.....	35
3.9	Data analysis.....	35
3.10	Ethical considerations .....	38
3.11	Quality of research .....	39
Chapter 4:	Results.....	42
4.1	Introduction .....	42
4.2	Response rate.....	42
4.3	Demographic information .....	42
4.4	The content validity of the Interview Report Form.....	44
4.4.1	The CVR of the individual items in the Interview Report Format .....	44
4.4.2	The CVI of the Interview Report Form .....	45
4.4.3	Suggestions for Interview Report Format .....	46
4.5	The content validity of the Assessment protocol for persons who ambulate .....	47
4.5.1	The CVR of the individual items in the Assessment protocol for persons who ambulate .....	47
4.5.2	The CVI of the Assessment protocol for person who ambulate.....	48
4.5.3	Suggestions for the Assessment protocol for persons who ambulate .....	49
4.6	The content validity of the Assessment protocol for persons who use a wheeled device.....	50
4.6.1	The CVR of the individual items in the Assessment protocol for persons who use a wheeled device .....	50
4.6.2	The CVI of the Assessment protocol for persons who use a wheeled device .....	51
4.6.3	Suggestions for the Assessment protocol for persons who use a wheeled device...	52
4.7	The content validity of the Assessment protocol for persons with cognitive impairment .....	53
4.7.1	The CVR of the individual items in the Assessment protocol for persons with cognitive impairment .....	53
4.7.2	The CVI of the Assessment protocol for persons with cognitive impairment .....	54
4.7.3	Suggestions for the Assessment protocol for persons with cognitive impairments...	55
4.8	The content validity of the Assessment protocol for persons with visual impairment	57
4.8.1	The CVR of the individual items in the Assessment protocol for persons with visual impairment .....	57
4.8.2	The CVI of the Assessment protocol for persons with visual impairment .....	58
4.8.3	Suggestions for the Assessment protocol for persons with visual impairments.....	59
4.9	Summary of the relevance and representation of the Interview Report Format and the assessment protocols.....	60
Chapter 5:	Discussion .....	62

5.1	Introduction .....	62
5.2	The content validity of the CoMATI in the context of the Cape Town metropole .....	62
5.3	Varied responses of SMEs .....	62
5.4	Items rated as Useful but not Essential and activity limitations .....	63
5.5	Items rated as Useful but not Essential and individual needs .....	66
5.6	Summary.....	69
Chapter 6: Conclusion .....		71
6.1	Introduction .....	71
6.2	The content validity of the CoMATI in the context of the Cape Town metropole .....	71
6.3	Strengths of the study .....	71
6.4	Limitations of the study.....	72
6.5	Recommendations .....	73
6.5.1	Recommendations on changes to CoMATI .....	73
6.5.2	Recommendations for occupational therapy practice .....	73
6.5.3	Recommendations for occupational therapy education .....	74
6.5.4	Recommendations for future research.....	74
6.5.5	Recommendations to the Department of Transport and Public Works.....	75
References.....		76
Appendices .....		90
Appendix A: The CoMATI Interview Report Format.....		90
Appendix B: The Assessment protocol for persons who ambulate .....		92
Appendix C : The Assessment protocol for persons who use a wheeled device .....		95
Appendix D: The Assessment protocol for persons with cognitive impairment .....		98
Appendix E: The Assessment protocol for persons with visual impairment .....		103
Appendix F: The CoMATI ordinal scale.....		105
Appendix G: The CoMATI descriptor of public transport use .....		106
Appendix H: Invitations to SMEs .....		110
Appendix I: Consent form.....		111
Appendix J: The Content Validity Rating Scale (example).....		115
Appendix K: Health Research Ethics Committee Approval Notice.....		<b>Error! Bookmark not defined.</b>



## List of tables

Table 1: Demographic Variables of SMEs (n=5) .....	42
Table 2: Suggestions received from SMEs (n=5) for the Interview Report Format .....	46
Table 3: Suggestions received from SMEs (n=5) for the Assessment protocol for persons who ambulate .....	49
Table 4: Suggestions received from SMEs (n=5) for the Assessment protocol for persons who used a wheeled device .....	52
Table 5: Suggestions from SMEs (n=5) for the Assessment protocol for persons with cognitive impairment .....	55
Table 6 Suggestions from SMEs (n=5) for the Assessment protocol for persons with visual impairment .....	59
Table 7 Summary of average agreement from SMEs and the CVI in the CoMATI .....	60

## List of figures

Figure 1: The number of SMEs (n=5) with impairment-specific experience.....	43
Figure 2: CVR for items (n=34) in the Interview Report Format .....	44
Figure 3: Individual SME (n=5) rating variance in the Interview Report Format.....	45
Figure 4: CVR for items (n=47) in the Assessment protocol for persons who ambulate .....	47
Figure 5: Individual SME (n=5) rating variance in the Assessment protocol for persons who ambulate .....	48
Figure 6: CVR for items (n=42) in the Assessment protocol for persons who use a wheeled device.....	50
Figure 7: Individual SME (n=5) rating variance in the Assessment protocol for persons who use a wheeled device.....	51
Figure 8: CVR for items (n=36) in the Assessment protocol for persons with cognitive impairment .....	53
Figure 9: Individual SME (n=5) rating variance in the Assessment protocol for persons with cognitive impairment.....	54
Figure 10: CVR for items (n=23) in the Assessment protocol for persons with visual impairment .....	57
Figure 11: Individual SME (n=5) rating variance in the Assessment protocol for persons with visual impairment .....	58

## Definition of key terms

**Occupation:** In occupational therapy, the experience of doing things is considered an important contributor to health. People engage in occupations for personal purposes as well as to meet the needs and expectations of society through self-maintenance, self-expression and fulfilment, which can be broken down further into inherent actions and tasks. Through engaging in occupations, persons draw from their capabilities, test their competencies and shape their self-concept and identity (2).

**Occupational performance:** Occupational performance can be grouped into functional tasks and roles within the domains of activities of daily living (ADL) (self-care), instrumental activities of daily living (IADL) (community and homemaking skills), work, play, leisure and sleep (3). Occupational performance is viewed as the ability to engage in daily life tasks which support activities of daily living, instrumental activities of daily living, work, play, leisure and social participation.

**Persons with disabilities (PWD):** including “those who have long-term physical, mental, intellectual or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others” (4)(p4).

**Disability:** “difficulties encountered in any or all three areas of functioning” where the three areas of human functioning are impairments, activity limitations and participation restrictions (5) (p5) .

**Impairment/s:** the “problems in body function or alterations in body structure” (5)(p5) ); “the loss and/or abnormality of mental, emotional, physiological, or anatomical structure or function, including pain as a limiting experience” (6)(p.597).

**Activity limitations:** “difficulties in executing activities” (5)(p5).

**Participation restrictions:** “problems with involvement in any area of life” (5)(p5).

**Environmental factors:** “the world in which persons with different levels of functioning must live and act. These factors can be either facilitators or barriers. Environmental barriers include: products and technology; the natural and built environment; support and relationships; attitudes; and services, systems, and policies” (5)(p5).

**Public Transport:** for the purpose of this study and as the understanding of the researcher and developers of the CoMATI refers to the Golden Arrow Bus services, MyCiti Bus services, minibus taxi services and Metrorail train services available in the Cape Town metropole.

**Assessment:** “actions such as examining, measuring, testing or observing the patient, using structured formats and comparing observed performance to specified criteria, standards or norms” (p.197)(7).

**Evaluation:** “the process of obtaining and interpreting data necessary for treatment” (6)(p.595).

**Validity:** “implies accuracy as well as relevance of response...Validity is the degree of correspondence between the concept or characteristic being measured and the way in which it is represented in the natural environment” (8) (p.114).

**Content validity:** “examines how well an assessment represents all aspects of the phenomenon being evaluated or studied” (p155)(9).

**Psychometrics:** include three types of reliability (interrater reliability, test-retest reliability and internal consistency), three types of validity (content validity, criterion validity and construct validity) as well as assessment sensitivity (8).

**Dial-a-Ride:** Available in the City of Cape Town since 1998, Dial-a-Ride is a limited service for PWD who qualify for specialised transport because they experience difficulty using public transport services independently (10).

**Sukuma:** Available in Durban since 1998, Sukuma is a fixed route transport service for PWD who qualify for specialised transport because they experience difficulty using public transport services independently (10).

**Uber Assist:** Offered by Uber to people with different accessibility needs (11).

## Abbreviations

PWD – Person with a disability/Persons with disabilities

NDP 2030- National Development Plan 2030

WHO – The World Health Organisation

CRPD – Convention on the Rights of Persons with disabilities

WPRPD – White Paper on the Rights of Persons with disabilities

ADL – Activities of daily living

BADL – Basic activities of daily living

IADL – Instrumental activities of daily living

SME – Subject Matter Expert

CVR – Content Validity Ratio

CVI – Content Validity Index

# Chapter 1: Introduction

*“We have a moral duty to remove barriers to participation, and to invest sufficient funding and expertise to unlock the vast potential of people with disabilities. Governments throughout the world can no longer overlook the hundreds of millions of people with disabilities who are denied access to health, rehabilitation, support, education and employment at the local, national and international levels”- Professor Stephan W Hawking in the foreword to the World Report on Disability (p.ix) (5).*

## 1.1 Background to the study

The late Professor Hawking has exemplified that disability is not so much the product of an individual's medical condition, as a biomedical approach would suggest, but rather a consequence of the environmental factors which a person with a disability (PWD) experiences (5,12,13). The ability of PWD to access meaningful activities in their environment provides opportunities for them to explore their potential (4,14,15). Community mobility refers to the extent to which a person is able to travel within their community in order to meet their needs and preferences (16). For example, a person's ability to mobilise within their community enables participation in their chosen field of work outside the home. Community mobility is therefore linked to participation (16). Participation occurs in relation to a person's skills and abilities as well as the environment in which they live (5). To address the participation restrictions experienced by PWD, special focus should be placed on the environmental barriers that PWD experience in daily life (5,13,14,17,18).

The South African Constitution upholds the rights of its citizens and recognises that participation in the community and accessing opportunities in health, employment and education, are important for well-being. In light of South Africa's Constitutional dispensation, there is a positive obligation imposed on government to address social discrimination, such as the barriers to access, experienced by marginalised groups, including PWD (4,19). Every individual has the right to access occupations which satisfy their needs and support their health and well-being. For many, this requires access to resources and inclusion into social contexts (20). The South African government's approach to health therefore values quality of life, and the ability of citizens to realise their potential through participation in their environments (4,19).

Justice acknowledges the differences between persons and their contexts while addressing well-being and social inclusion strategies (21). Social justice requires that attention is paid to vulnerable groups, achieving substantive equity where there is social disadvantage and include equalization of opportunities for PWD (22). Internationally, the rights of PWD are recognised by the United Nations in the Convention of the Rights of Persons with Disabilities (CRPD) (4). Article 3 of the

CRPD mentions “Full and effective participation and inclusion in society”, “Equality of opportunity” and “Accessibility” (p.5.) (4) as some of the key principles which uphold the rights of PWD.

Transport as a means of access to basic needs, employment, health care, education, recreation and leisure, is seen as critical by the National Development Plan 2030 (NDP 2030) for citizens to achieve adequate living standards (17). The public transport systems that currently operate in South Africa consist of rail, bus and minibus taxi systems. In South Africa, many people rely on public transport as a means of accessing opportunities outside of their central locale (23). Minibus taxis are used by more than half (51%) of the households that use public transport in South Africa, followed by buses and trains (24). Minibus taxis are commonly used by children for accessing school and adults for accessing their places of work (23–25).

The results of a public opinion poll, published in 2013, gauged the confidence of South Africans regarding public transport use on a regular basis. Specific responses related to concerns regarding public transport included quality, frequency, safety, customer service, mobility and accessibility (26). The NDP 2030 (17), the Draft Revised White Paper on National Transport Policy 2017 (27), and community opinion, indicate the importance of transport to South Africans and policy makers alike. Although the need for effective transport systems has been identified, progress in achieving these goals remains slow (24,25,27–30).

In South Africa’s urban areas, poverty and spatial segregation inherited from Apartheid has resulted in social and economic exclusion. A lack of a means for urban mobility results in limited opportunities for marginalised groups (31,32). The provision of adequate, safe and accessible transport to South Africans supports community mobility, especially for South Africans living in rural or impoverished areas (33). The unequal distribution of resources across different groups of people can be seen as a form of social injustice. Improving public transport systems for the benefit of low income households and facilitating mobility for all vulnerable groups in order to redress injustices and inequalities, remains a focus in the NDP 2030 (23).

The challenges to using public transport and accessing the community faced by the general population in South Africa are experienced even more so by PWD (29). A lack of accessible transport is a major barrier identified by PWD in South Africa (34,35). 72% of PWD in a low socio-economic area in Cape Town identified transport as the main problem with accessing services (34). The WPRPD specifically acknowledges that inaccessible transport systems currently operating in South Africa are a barrier to the right to equality for PWD (33). Policy statements on accessibility in The White Paper on National Transport Policy (27) acknowledge that the needs of PWD are overlooked in public transport systems. The White Paper on National Transport Policy promotes the responsibility of government and civil society to cater for a wide range of passengers, including “all contracted public transport vehicles...must be universally accessible so as not to

pose barriers to all targeted categories of passengers; a continuous accessible path of travel is to be provided for all passengers, including persons with disability, to connect public transport with places such as social services and accessible housing” (27)(p.44.)

South Africa has integrated the obligations of the CRPD by implementing the White Paper on the Rights of Persons with Disabilities (WPRPD) (33). The WPRPD acknowledges that in order to achieve the right to equality for PWD, the ability to move around the community supports all aspects of life for PWD. To remove barriers to access and participation for PWD, the WPRPD identifies universal design and access in public and commercial space and measures to improve impairment specific needs, as some of the dimensions that need to be addressed (33). Broad strategies for improving access to health, education and transport facilities, include considerations of the inclusion of ramps, crosswalks, overpasses, sidewalks, seating and shelters, good lighting and an environment which is perceived to be safe, placement of stops close to entrances or the front of buildings and reduced walking distances (27,36).

The Disabled People South Africa (DPSA) organisation advocates human rights as predominantly a “cross-disability” issue, while service delivery is primarily a “disability-specific” issue. The provision of specialisation within transport services, e.g., special transport for persons with physical disabilities, requires broad and segmented solutions to achieve the inclusion of all PWD within South Africa (37). Various organisations in South Africa have highlighted the discrimination experienced by PWD and have advocated for the provision of transport systems specifically for PWD (10,29,35). PWD have identified a particular need for services on demand and door to door services at pick-up and destination points and are prepared to pay more than the fares for mainstream public transport for a specialised transport system that is safe, reliable and easy to use (37).

To date, advocacy has given rise to specialised transport service initiatives for PWD. In the public sector, government initiatives such as Dial-A-Ride services (in the City of Cape Town) and Sukuma (in Durban) aim to provide transport services for PWD exclusively. In the private sector, specialised transport services run by private sedan taxi services such as Uber Assist, offer drivers who attended training for assisting PWD. However, the specialised public transport services require high government subsidies and are limited in their ability to service large numbers of PWD. As a result, this leaves many PWD in need of services on a daily basis (10,37).

Due to limited fleet numbers, Dial-A-Ride is currently operating at maximum capacity (10) and is only able to serve a small percentage of the population of PWD in Cape Town. To use Dial-A-Ride services, an applicant applies to the City of Cape Town, and is subsequently referred to an occupational therapist to determine their eligibility. The eligibility assessment process ensures that



only PWD who are not able to independently access their communities through use of public transport, are utilising the service (37).

Dial-A-Ride has contracted the services of occupational therapists since 2003 to conduct eligibility assessments. In May 2017 the Worthmann & Associates Occupational Therapy team (W&A team) were contracted to assess existing Dial-A-Ride users and new Dial-A-Ride applicants as part of the City of Cape Town (CoCT) tender process 39C-006 OT. No assessment tool or guidelines were provided by CoCT to enable the W&A team to provide a service consistent with previous occupational therapy services. As a result, and in agreement with the CoCT, the W&A team determined that the criteria for eligibility to use Dial-A-Ride would be a person's inability to use at least one form of public transport for each of their desired trips. Following an online search of existing occupational therapy assessments, the W&A team were not able to find a measurement tool that specifically measures an individual's ability to use public transport as a means of community mobility. As a result, the W&A team, consisting of four occupational therapists with considerable clinical experience in evaluation, developed an assessment tool for their intended purpose. The main aim of the assessment tool was to establish whether Dial-A-Ride users and applicants have the ability to independently use at least one form of public transport, despite having an existing health condition and/or impairment/s. Another stipulation by CoCT of the eligibility assessment was to adhere to a duration of one hour. Therefore, the budget did not support observing applicants interacting on all forms of public transport, thus actual occupational performance. The W&A team therefore had to develop an assessment tool that was suitable for assessment of individuals with a variety of impairments and needed to simulate the various challenges that individuals may face when attempting to access public transport within the context of Cape Town. For the purposes of determining eligibility the W&A team developed a semi-formal interview; five assessment procedures for five different impairment categories; and a user manual for the occupational therapists conducting the assessments to ensure consistency in administration. The outcome of eligibility assessment was provided in a report format to CoCT that provided an executive summary of the applicant's ability to use public transport, the eligibility determination and the Dial-A-Ride user's travel and assistance needs.

Two occupational therapists from the W&A team realised the scope for further development of the eligibility assessment to make it suitable for the evaluation of community mobility and for the planning of occupational therapy intervention. As a result, The Community Mobility Assessment Tool for Individuals (CoMATI) was developed as an evaluation tool to support an occupational therapist's evaluation of community mobility performance within the context of Cape Town's formal and informal settlements in urban and peri-urban environments.

The CoMATI evaluates an individual's ability to independently use public transport as a means of community mobility. The performance demands of public transport use comprise of a range of abilities and/or potential barriers that an individual may encounter. As the CoMATI is conducted within the context of a clinical practice rather than through observing an individual engaging in the use of public transport, it is fair to question whether the selected tasks in the CoMATI are relevant and representative to public transport use in Cape Town as this may influence the validity of performance evaluation.

## 1.2 Problem statement

Although the CoMATI was developed as an evaluation tool, the validity of the tool is not known. The researcher was not able to compare the outcomes of the CoMATI to existing tools that measure similar constructs, therefore a foundation of validity evidence needed to be established. As the CoMATI comprises newly developed assessment protocols, no research has been conducted to determine whether each of the protocols in the CoMATI accurately assess what it set out to assess.

In the CoMATI, the inference made on an individual's ability to independently use public transport, is dependent on the information that is obtained from the interview, and from observations made of the individual's performance. Information from the CoMATI interview and objective assessment is dependent on the content of the various parts of the assessment tool. Therefore, for the interpretation of the evaluation to be valid, the content of the CoMATI needs to be relevant to independent public transport use and fully represent the domain of independent public transport use. Therefore, to evaluate the degree to which the CoMATI measures performance of independent public transport use, it is important to establish the degree to which the content of the CoMATI is representative of public transport use as a means of community mobility (8,38,39).

## 1.3 Purpose of the study

The purpose of this research was to develop an evidence base for the content validity of the CoMATI by seeking the opinions and evaluations of an expert panel (1,9,38). This research will determine the extent to which each item of the CoMATI is *relevant* to independent public transport use and whether the content is *representative* of the functional performance necessary for independent use of public transport.

## 1.4 Research question

To what extent is the interview content and the content of the assessment protocols in the CoMATI relevant to, and representative of, the domain of public transport use, in the context of the Cape Town metropole?

## 1.5 Research aim

To determine the content validity of the CoMATI in the context of the Cape Town metropole.

## 1.6 Objectives

In order to meet the aim above, the researcher evaluated the degree to which experts agree that:

- The content of the interview is relevant and representative to the domain of public transport use.
- The content of the Assessment protocol for persons who ambulate is relevant and representative to the domain of public transport use.
- The content of the Assessment protocol for persons who use a wheelchair is relevant and representative to the domain of public transport use.
- The content of the Assessment protocol for persons with cognitive impairment is relevant and representative to the domain of public transport use.
- The content of the Assessment protocol for persons with visual impairment is relevant and representative to the domain of public transport use.

## 1.7 Rationale for the study

Occupational therapy intervention addresses an individual's ability to participate in their occupations when such participation is restricted due to a medical condition, impairment or disability, or where their contexts prevent the development or pursuit of their potential. Evaluation in the occupational therapy process is a valuable and necessary step that guides and facilitates treatment planning. Evaluation occurs when the results of assessment are interpreted in relation to an individual and used to monitor any changes in occupational performance following intervention from an occupational therapy (7). Occupational therapists evaluate occupational dysfunction in the domains of activities of daily living (ADL) (self-care), instrumental activities of daily living (IADL) (community and homemaking skills), work, play, leisure and sleep (3).

Community mobility, as an IADL, is a relevant consideration in occupational therapy intervention that requires evaluation. Presently, 76,7% of households in South Africa rely on the use of minibus taxis, buses and train for community mobility purposes (24,37,40). Evaluating and improving an individual's ability to use public transport as an outcome of occupational therapy services, will support the redress of some of the inequalities experienced by PWD in South Africa (41).

While certain tools which assess IADL consider use of public transportation (42,43), in many developed countries, the evaluation of performance in the use of transportation has been limited to measuring driving abilities. Increasing recognition of supporting community mobility through the

promotion of effective use of public transportation in developing countries has been acknowledged by the World Federation of Occupational Therapy (WFOT) as well as the WHO (44). The development of the CoMATI will therefore be valuable for South African occupational therapists to evaluate an individual's performance in the use of public transport. An occupational therapist may be able to use the assessment findings of the CoMATI to evaluate whether an individual is able to use public transport (i.e., predictive), and whether they require further intervention at the environmental or personal level and/or the use of specialised transport services (i.e. evaluative).

The occupational therapy profession requires measures that are able to demonstrate reliable and valid assessment outcomes to ensure quality services across various practice settings. In order to support occupational therapists engaging in quality practice, it is better to have occupational therapists using an accurate, consistent assessment tool. To achieve this we need to enquire into the psychometric properties of the assessment (7). By conducting this research, we are able to demonstrate the psychometric properties of the CoMATI to support South African occupational therapists in their considerations of the best tools to implement in their practice with clients.

A valid and reliable evaluation tool will support quality practice. Reliability refers to the consistency of an instrument, where we would be referring more to the behaviour of the CoMATI when implemented by different occupational therapists and in different clinical settings. Validity speaks more to the accuracy and dependability of what the instrument is measuring. Evaluation of validity often begins in the developmental phase and thus relates to the construction of the CoMATI (45,46).

Validity examines the degree of correlation between a concept that is being measured and its representation in the natural environment (9,47,48). Validity is a continuous process as it seeks to establish which interpretative meanings are reasonable as the evaluation tool is applied in different ways (39,45,49–51). Scientific measurement of the many variables, multiple occurrences as well as imprecise or assumed criteria that influence performance, are likely to influence valid results (7). More specifically, content validity reflects the validity of the items and subscales of an assessment to accurately represent the concept being measured (8,9,46). The degree of domain representation and relevance of specific items in the assessment tool can be established through determining the content validity of the CoMATI (46).

Content validation is a foundational building block in test development (52). In the development of an assessment tool such as the CoMATI, the first steps should include specifying the intended use and interpretations of the test scores as well as gathering validity evidence based on test content (53). Some would argue that if an instrument lacks content validity then it is impossible to establish reliability for it (54). In a review of various definitions of content validity (52,55,56), differences exist, however, a common trend include that content validity has to do with congruency

between the actual content of the measure and how representative it is of the behaviours found in the domain in question. Therefore, the evaluation of the validity of the content of the CoMATI was considered appropriate as the CoMATI is considered to still be in development.

For the CoMATI to support evaluation in occupational therapy practice it is important to establish whether the content of the CoMATI measures public transport use. Evidence for the content validity of the CoMATI will support using the CoMATI to (a) measure the outcomes of occupational therapy intervention and (b) support a broader demonstration of the value and quality of occupational therapy services. Evidence of content validity will further support the use of the CoMATI to identify functional problems experienced by PWD who use public transport on an individual level, as well as measure any changes in performance following occupational therapy treatment.

## Chapter 2: Literature Review

In this literature review, the activity of public transport use will first be framed within the perspective of occupational therapy practice, as well as the International Classification of Functioning, Disability and Health framework (ICF). Secondly, theories underpinning evaluation processes in occupational therapy will be discussed. Lastly, considerations for obtaining client-centred information in interviews and measuring performance of the motor, cognitive and visual skills and abilities which may be relevant to public transport use and/or community mobility, will be explicated.

### 2.1 Framing the occupation of public transport use

Disability is viewed by the World Health Organisation (WHO) as a complex phenomenon that is influenced by problems within an individual's body as well as complexities caused by contextual factors (57). The WHO has adopted the ICF (58) as it provides a holistic, biopsychosocial approach to disability. The ICF defines disability as the body structure and function impairments (e.g. blindness or paralysis), activity limitations (e.g. eating and dressing) and participation restrictions (e.g. restrictions in role as worker or mother). The ICF treats disability as a continuum, and guides decision-making regarding individual evaluation, treatment planning and evaluation of outcomes of treatment (5,59).

When an individual is not able to perform an activity, one should determine what contributes to an individual's inability to meet the performance demands (7). An occupational therapist's evaluation of occupational performance relies on clinical reasoning and occupation-based analysis to (a) determine how the environment may influence performance and (b) understand what components of performance need to be assessed (20). A clear conceptual framework will ensure cohesiveness between what an occupational therapist assesses, and what the outcome of occupational therapy intervention may be, and is imperative to the development and support of a valid assessment (7,8,60–62).

Occupation has both performance and contextual dimensions. Various frameworks of occupational performance may support an occupational therapist's perspective of occupational performance (6,63). Evaluation of dysfunction in occupational performance is critical to planning treatment (3). Assessment tools used in occupational therapy can evaluate an individual's disability or aspects of the phenomenon, make decisions regarding treatment planning, measure outcomes of treatment or predict future functioning (63,64).

Reed and Sanderson (65) define ADL as the tasks that an individual performs in order to care for themselves, including self-care, communication and travel. Other authors distinguish differences

in ADL as being the basic ADL (BADL) which comprise of self-care type activities, which generally support health and well-being, from instrumental ADL (IADL) (65). While definitions vary between occupational therapists, common to many is the recognition that functional mobility is considered to support an individual's basic needs (20). Barer and Nouri (42), categorise IADLs into getting about (transport use, walking in the community, getting into and out of cars and driving), household-based activities and other leisure orientated activities. Lawton and Brody (42) defined eight IADLs which are essential to community living, namely, money management, using the telephone, using medication, travelling, shopping, meal preparation, laundry and housekeeping (66). IADL represent multi-step activities that are complex to perform and require the use of objects, such as a telephone or bag and high-level performance of social, physical and mental skills such as judgment, problem solving and sequencing. Occupational therapists widely recognise that the performance of IADL is central to well-being and quality of life (66). Public transport use, within the context of South Africa, can therefore be defined from an occupational therapy perspective as an IADL. Additionally, an individual's ability to competently perform tasks related to the use of public transport will be influenced by contextual factors in the environment. From a measurement point of view, an outcome of participation and an outcome of occupational performance are very similar (8,67). Framed by the ICF, an individual's dysfunction in the use of public transport can be viewed as a reflection of underlying impairments of body structure and function (e.g., physical or cognitive), activity limitations (e.g., tasks necessary for public transport use) and the influence of contexts (e.g., physical environment) in which performance occurs.

The influence of contextual factors on PWD ability to use public transport was discussed in Chapter 1: Background to the study. South Africa's population has a wide range of socio-economic status and variations in types and prevalence of disability. This results in diverse individualised needs of PWD. When approaching the transportation needs of PWD, various impairment needs should be considered (68). The evaluation of occupational performance of public transport use, framed by the ICF, involves the complex measurement of tasks or actions based on either performance or capacity (e.g., walking, climbing steps, reading and communicating); a series of actions or specific tasks that achieve an objective that is central to role behaviour (e.g., using a train to travel to work) as well as organised activity which reflects the combined efforts of actions and tasks (e.g., participation in employment) (66).

## 2.2 Occupation-based evaluation

Occupation-based analysis is based on a particular individual's capacity to engage in the occupation within their relevant contexts. Occupational performance refers to the ability to perform chosen and meaningful occupations that are culturally defined and support self-care, life enjoyment and social and financial contributions to the community (67,69–71). Evaluation of

occupational performance is conducted in occupational therapy using either a bottom-up or top-down approach and involves both qualitative and quantitative approaches (7,72). A client-centred approach to evaluation should first establish how participation is experienced. In the ICF, activity and participation are qualified by performance and capacity. Performance is what an individual is experiencing within their social contexts whereas capacity is a reflection of their highest probable abilities within a standardised environment (58). Occupation is expressed within a hierarchy of terms such as activities, tasks and roles (3). Activities are the specific actions of pursuits that form the foundation in the doing process. Tasks are goal-directed units of doing with the complexity of temporal boundaries, structures and rules and socio-emotional dimensions. The roles of a person define the activities and tasks necessary for competent performance (3). The ICF classification of body function and structures is useful for documenting an individual's impairments which may impact on their ability to manage activities and participation in everyday life (73).

Occupational therapists typically gather qualitative information about an individual's occupational performance from the individual's subjective opinions and feelings through interviews. In this way, difficulties in occupational performance (such as role restrictions) can be identified first, and then underlying impairments and activity limitations are assessed using performance component measures.

## 2.3 Psychometric properties

Assessment tools used in occupational therapy should gather objective, formal recorded observations of performance through examination, measurement and testing processes. Observation is a common, objective method of collecting information about an individual's performance (74). Objective assessment may involve the use of formal and standardised procedures as well as informal interactions and skilled observations. Formal assessments are considered able to support reliable and valid assessment. Conversely, formal assessments have been criticised for providing limited information for the evaluation of occupational performance that supports a client-centred perspective (74). In the absence of prescribed procedures and scoring, the scoring process is classified as informal or unstructured (74). Non-standardised approaches are not uniform in administration and provide occupational therapists with opportunities to individualise the assessment. In this way, assessment supports a client-centred approach that is faithful to the philosophies and principles of occupational therapy (74).

Occupational therapists may review the psychometric properties of an assessment tool before selecting the tool for evaluation purposes (7,75). Formal, structured observations and scoring conducted in a prescribed setting may yield reliable data, however, the validity of the evaluation



may be threatened if the performance items are not relevant to the individual construct being measured (74).

In the so-called tripartite or trinity of validity, test validity is seen to include content validity, criterion-related validity and construct validity (51,54,76). This approach has been criticised for being too fragmented, often rendering reviews of an instrument's validity to a check-list approach. This in turn promotes a misconception that validity is static which would then negate the influence of contexts when an instrument is implemented (53). Conversely, a unitary approach to validity encourages individuals to evaluate how they are interpreting test scores and how to act on this basis (39). In this approach an evidentiary chain of evidence is considered a suitable means to establish validity, in an ongoing and continuous process as testing contexts change (77). This is because, according to definitions of validity, the CoMATI can only be evaluated with respect to its specific testing purpose, and when one examines the usefulness and appropriateness of the CoMATI, the content of the tool needs to be evaluated. Evidence of content validity refers to a review of the content of an assessment tool, regarding its relevance and representativeness to the theoretical construct. Studies that determine representation, require the inspection of all the items and tasks that are undertaken in evaluation (39,50).

There are four domains of content validity described by Sireci (45), which include domain definition, representation, relevance and appropriateness. The domain definition of an instrument typically delineates the content areas and abilities that the test measures (46). A domain definition would support an occupational therapist's selection of an instrument which specifies content that will reflect the necessary skills and abilities required for functional performance; thus evaluating congruency between a domain and test content. According to Sireci (46), when one evaluates the definition, one needs to establish whether the test content is congruent with the domain. This congruency is scrutinised when all the items and tasks on a test are evaluated to determine how adequately the domain is represented. Representation refers to the degree to which a measure represents and adequately measures the intended domain. Ongoing evaluation of items may then entail determining whether certain items that are representative, may have a higher relevance to the domain than others (46).

Sireci (46) encourages item developers to use appropriate methods when developing and evaluating content and suggests various means of putting quality control measure in place. These measures include reviews of the items by a panel of experts and then later pilot testing of items including statistical item analysis and analysis of differential item functioning which would provide information about which items are more difficult for certain sub groups. Criterion validity is established by exploring similarities with a gold standard tool, or criterion reference, which shares

a similar construct. Evidence gathered on the content validity and criterion-related validity is often gathered to substantiate construct validity of a tool (78).

## 2.4 Expert evaluation

Evaluation of content validity typically relies on the opinions of subject matter experts (SMEs) (46). SMEs are able to evaluate the extent to which items are relevant to and representative of the domain tested (46). Clinical reasoning guides an occupational therapist's decision-making and evaluation in the occupational therapy process (7). Occupational therapists rely on knowledge as well as interactive, narrative and conditional reasoning to determine what questions to ask in interviews and to discriminate between relevant and irrelevant items when evaluating performance (7,74).

Researchers have explored reasoning processes, questioning the intangible processes which underlie the development of competence in professionals, including occupational therapists. To understand reasoning processes, researchers have attempted to differentiate between grades of professionals, from novice to expert (79). In a paper by Slater and Cohn (80), integrating a five-stage model of skill acquisition with findings from a clinical reasoning study conducted by the American Occupational Therapy Association, the abilities and needs of occupational therapists at various stages of skill and competency development are outlined. Slater and Cohn (80) determined that novice occupational therapists focus primarily on objective findings, are reliant on rules to guide decision-making and demonstrate a limited ability to contextualise an individual's experience. Conversely, competent practitioners were better able to determine which information and observations are relevant. Finally, experienced occupational therapists, i.e., more proficient in practice, were considered to have a holistic understanding of an individuals' intervention needs, and they were able to reflect in action by relying on several types of reasoning simultaneously and drawing from previous experiences (7,79,80). Rassafiani et al (79) conducted a study in Australia to examine how occupational therapists with similar clinical experience discriminated between hypothetical cases and their consistency in decision-making. The researchers determined that years of clinical experience did not influence the ability of the participants to discriminate consistently, but rather clinical knowledge appeared to have a greater influence. The researchers concurred with Unsworth (81) that although it is not clear how many years of clinical experience is necessary to achieve a high level of expertise, occupational therapists can achieve expertise by five years of experience. More importantly, experts can be differentiated from novices in their ability to demonstrate consistency in decision-making when differentiating between relevance and irrelevance and when reasoning about problems and their causal factors (79). When content is validated for the purposes of developing an instrument, at least five experts are required to have sufficient control over chance agreement. It is also suggested that while content is in a

development phase, no more than 10 experts are required (52,82). As the number of experts increases so would the probability of chance agreement decrease (1).

Reliable and valid evaluation of occupational performance should be client centred and provide an occupational therapist with an understanding of the individual's subjective experience and the contexts in which participation occurs. Evaluation of occupational performance requires a holistic approach, which reflects both the frameworks and philosophies which guide occupational therapy practice, as well as approaches to function and disability supported by the WHO.

## 2.5 Interviews in Occupational Therapy

Interviews are used in occupational therapy to, among other reasons, determine an individual's ideas and concerns about participation. Approaches to an interview may be formal, e.g., based a conceptual framework, or relying on an informal approach which is supported by clinical reasoning (3). The Canadian Occupational Performance Measure (COPM) and the Occupational Performance History Interview II (OPHI-II) are two examples of interviews which are flexible, allowing for the occupational therapist to use open ended questions to obtain information about the individual (74). Non-standardised methods for gathering information in the interview process are commonplace in occupational therapist. Open-ended questions are used to obtain information about occupational performance. Closed-ended questions are used to determine specific information (3,74). Reports on an individual's occupational performance and the physical environment can be gathered from either the individual or their caregiver/family member's (83,84). In addition, occupational therapists may rely on secondary sources of information such as public information, client records, caregivers and family members' opinions (85). Ongoing clinical reasoning and problem analysis is conducted by the occupational therapist in active partnership with the individual and their family. Given the lack of insight or self-awareness which may result from cognitive impairment, interviews with family members is often essential (84).

The COPM is a semi-structured interview that built on the Canadian Model of Occupational Performance (CMOP). The COPM measures an individual's perceptions of their performance over time and focusses on problem identification (74,86). The COPM has been shown to have good internal consistency and test-retest reliability (87,88) as well as criterion and construct validity (89). Content validity was established during the development of the COPM by Law et al (88). Further evidence of content validity was gathered in a doctoral study conducted in Canada. Chan et al (90) recruited nine expert reviewers who were clinical specialists who had experience working with the COPM, clinical measurement experts, and Occupational Therapy faculty members from the University of Alberta. The expert reviewers completed a questionnaire composing of 11 items and were asked to evaluate the relevance and representativeness of the items of the COPM in relation

to the construct of occupational performance. The reviewers rated the items using a five-point ordinal scale and were given opportunity to comment on each item. The result of the study indicated that the overall relevance of the COPM's content to the evaluation of occupational performance was good. However how this was determined is unclear as the methodology was outlined in an unpublished doctoral dissertation. Feedback from the reviewers included criticism that results obtained were dependent on the individuals' understanding of the processes and insights into their situations and whether they had ever performed the activity. Further, the COPM was criticised as inadequate for assessing performance components, especially mental and spiritual aspects. Chan et al (90) concluded that in the absence of information on client's performance components, assessment results from the COPM alone would be less than useful in the clinical reasoning process (90). Arguably though, the focus of the COPM is to evaluate an individual's subjective satisfaction with their occupational performance, rather than their subjective performance components and so these criticisms may not be relevant to determining the content validity of the COPM. In a review of the emerging research and clinical literature related to the COPM, Carswell et al have defended these and similar criticisms that the COPM is not appropriate for individuals who lack insight or have dementia. The authors situate the COPM as a subjective measure of an individual's perspective. Further, they stress that the COPM evaluates occupational performance in its entirety and the problems considered to be most relevant to an individual. In this way the COPM supports a top-down approach to assessment (91).

The OPHI-II is a semi-structured interview focussing on the domains of activity and occupational choices, critical life events, daily routine, occupational roles and occupational behaviour settings. Use of the OPHI-II requires some knowledge of the Model of Human Occupation (92). The OPHI-II was developed on the findings of two preceding versions of the tool. The validity of the OPHI-II was evaluated by Kielhofner et al (93). Data was collected from 151 raters, on 249 subjects. Rasch analysis was used to analyse the data. Results from the Rasch analysis attested that the OPHI-II is a valid measure across cultures and languages and provides strong evidence that evaluation items capture underlying traits. Furthermore, the OPHI-II is able to differentiate between persons and levels of competence (93). Critiques of the OPHI-II suggest that the tool requires the guidance of an occupational therapist to assist an individual in building their occupational narrative into a coherent whole (74).

Other means of gathering information on performance, such as questionnaires, rely on self-report from the individual, with minimal input from the occupational therapist. The benefit of using a questionnaire is that the occupational therapist can control for certain biases; however, independent completion of the form is dependent on the individual's ability to provide a detailed occupational history as well as their literacy skills and motor skills (74). Self-reported measures of

IADL performance may be influenced by personal factors. Performance-based measures of IADL are also sensitive to these factors but have been found to be more reliable and valid when compared to self-report (94–96). Including performance based assessment in evaluation is valuable in supporting and interpreting an individual's self-reported performance of IADL (96).

## 2.6 Assessment of skills and abilities required for public transport use

The ability to walk is valued by most people and associated with quality of life and health (97). Effective evaluation and training of mobility skills is vital in the occupational therapy process where treatment concerns are aimed at improving participation. The prescription and provision of mobility devices, assistive devices and supervision may provide an effective means of support and may contribute positively to participation (98). Mobility limitations are caused by conditions which affect the central nervous system, orthopaedic conditions affecting the lower limbs, as well as ageing. Ageing is associated with internal changes to the sensory, visual, hearing, vestibular, cognitive capacities as well the nervous systems and musculoskeletal systems (99). As disruptions to motor behaviour can occur at various levels and a variety of systems, a corresponding degree of approaches and frames of reference for evaluation of motor behaviour exist (85).

In the process of reviewing literature, the developers of the CoMATI focussed on evaluation of cognitive, sensory, movement and movement related body functions, as well as functions specific to communication that were required for either public transport use, community mobility or IADL. Other functions such as muscle functions, cardiovascular and respiratory systems, were understood to have an influence on performance but were not specifically delineated as assessment items.

### 2.6.1 Community mobility for persons who ambulate

Concerns with effective treatment has resulted in numerous scales and evaluations of functional mobility and balance (100). Maintenance of balance and functional mobility is complex and consists of various limb movements, transitional movements and stepping actions. Balance requires the interaction of skeletal, neuromuscular, and sensory systems. Evaluation tools such as the Berg Balance Scale (BBS) (101), the Functional Reach test (102), the Timed Get Up and Go test (TUG) (103) and the Tinetti Balance and Gait Evaluation (Tinetti) (104) are considered to measure movements involved in the performance of ADL, IADL, work and leisure activities. All of these instruments may be administered in a clinical-settings as they require minimal equipment and time. All of these instruments report content validity, criterion validity and have shown good score reliability (105–107). The specific methods for establishing content validity for all of these instruments were limited in the literature, therefore this review of content validity methods will be limited to the TUG and BBS.

The TUG is a measure that evaluates an individual's ability to rise to standing from a chair, walk three metres, turn and walk back to the chair before sitting down again (103). In a content validation study conducted in the United States of America, by Ballinger et al (108), 18 participants who had undergone surgery to treat a hip fracture as well as elective total hip replacements, were asked to provide their perceptions of the relationship between activities and movements included in the TUG, the four-step stair climb, repeated chair stand and the long stair climb. The participants generally found that the content of the performance measures was relevant to activities and movements in their daily lives. The TUG was considered to be easier than everyday life due to the shorter walking distance required. Participants found the TUG easier to perform when they were able to use armrests of a chair. Difficulty of performing items in the TUG was influenced by pressure to complete the movement quickly. Variations in the height of the chair used in assessment compared to the chair used at home was considered to influence the relevance of TUG. The study concluded that each of the four selected performance measures are relevant to everyday life and may reflect certain difficulties with mobility (108).

The Berg Balance Scale (BBS) is a tool compatible with a task-performance approach and evaluates an individual's performance on 14 items which are considered to be common in everyday life. The tool evaluates an individual's ability to (a) maintain positions of increasing difficulty through incrementally diminishing the available base of support, (b) change positions from sitting to standing or chair to chair, turn, pick up objects from the floor and sit down on a chair. The content of the BBS was evaluated by 38 patients ranging in age from six to 93 years old as well as 32 health professionals who were nurses, physicians and physical therapists and occupational therapists. The participants were surveyed over three distinct phases to develop the content. Thereafter the reliability of the measure was assessed. While the details of the methods used to validate the content of tool are not published, the BBS has reported high interclass correlation coefficients ( $ICC=0,98$ ) for both intra-rater reliability and interrater reliability, high internal consistency ( $\alpha= 0,96$ ), and high correlations with other clinical measures. Further testing has supported discriminant validity of the test (85,101).

Scores in the BBS correlate with the Tinetti and TUG. The BBS and Tinetti both measure balance during the performance of sitting, standing and dynamic movements (101). The Tinetti varies from the other measures, as it is the only measure which measures the performance of balance (nine items) and walking (seven items) (104). Therefore, the advantage of the Tinetti is that it assesses more diverse aspects of balance. Conversely the TUG only measures a few aspects of balance (105).

The Functional Reach test varies from the other measures, as it measures an individual's ability to reach forward, to the sides and behind while maintaining standing balance (102). The Functional

Reach Test correlates with scores of mobility skills and walking speed. Furthermore, scores in the Functional Reach Test have improved following rehabilitation, indicating that it may be a valid measurement of the construct of balance (109).

This review of performance measures, which evaluate an individual's ability to balance and walk, suggest that assessment may be conducted in a clinical setting. Evidence for content validity of assessment conducted in clinical settings supports the practice to simulate daily life challenges. The skills and abilities required for persons who ambulate who use public transport is likely to include degrees of upper limb function and reach, balance activities in sitting, standing, walking and negotiating stairs as well as be influenced by personal factors such as pain, confidence and speed movement.

## 2.6.2 Community mobility for persons who use a wheeled device

Wheeled devices enable mobility in individuals who have difficulty mobilising in the home or community. Certain individuals may use a wheeled device only occasionally, for specific travel needs, while others may require a wheeled device in order to maintain their postural stability and mobility needs. There are three main categories of wheeled devices: 1-attendant propelled 2-manual wheelchairs and 3-motorised wheeled devices. Occupational therapists evaluate an individual's performance based on biomechanical focused evaluations. This may include, but is not limited to, evaluation of postural stability and the ability to adequately manage pressure relief (110). Presently the guidelines for adequate pressure management includes determining whether an individual is able to independently maintain an offloaded position for at least every 1-2 minutes every 30 minutes (111). Factors that contribute to the risk of pressure ulcer development include skin moisture, age, weight and skeletal frame size. According to a study conducted by Sonenblum et al (112), a full frontward (placing trunk on distal thighs) and full sideward lean (leaning on a table placed 10-12,5cm below the medial epicondyle of the humerus, next to the chair) reduced ischial interface pressure (IP) more than all other manoeuvres with no significant difference from each other (112).

Depending on the purpose of the selected wheeled device, the device may enable optimal outdoor mobility performance or hinder performance of an individual. Occupational therapists conduct evaluation of wheelchair mobility performance in order to evaluate whether a device adequately supports the individual's mobility needs (110). The evaluation of certain of these skills translate to community contexts, however, more complex skills translate poorly, owing to safety concerns from individuals with impairments. For these reasons, these assessments have been found to be more useful for evaluation of capacity during the mobility training phases, rather than for making inferences on an individual's performance in their real-world contexts. Therefore, wheelchair

selection and training requires an evaluation of an individual's preferences and performance needs, capacities and environments (98,110,113,114).

In an article published by Routhier et al (114), a literature review of existing wheelchair mobility assessments was conducted to determine the factors which influence wheelchair mobility; and then develop a conceptual framework for performance assessment. Routhier et al compared ten outcome measures. None of the ten measures were validated for a wide range of wheelchair users and only one measure partially assesses activities of daily living or social roles. Only three of the measures assessed both manual and powered wheelchairs. The measures conducted in controlled environments were The Functional Evaluation Rating Scale (FERS) (115), the Wheelchair Skills Test (WST) (116) and an obstacle course for the mobility of wheelchair-dependent paraplegics. These measures have demonstrated content validity as a measurement property. All three of these measures were conducted in a controlled environment. The remaining measures were conducted in either a real-world environment or virtual environment (114).

The FERS was developed as an evaluation tool to measure children's ability to master skills required for driving a powered wheelchair, as a means of validating a driving simulator. Content validity was established using a questionnaire completed by 20 experts, comprising senior physical therapists, occupational therapists, teachers and a rehabilitation engineer. The experts had experience in prescribing powered wheelchairs or in training PWD in the use of such devices and had worked with children with cerebral palsy and progressive muscular dystrophy. The experts reviewed a list of skills determined by the researchers and from one literary source, that were considered important for safe and efficient driving. Skills that were considered necessary by at least 70% of the experts were incorporated for functional evaluation. The authors of the study did not publish their analysis methods or cite how they obtained this acceptable level of agreement. As a result of the study, the FERS is composed of 12 tasks which include: "starting and stopping the wheelchair at will, starting and stopping upon request, driving straight (for 3.5m) in an open area, driving straight (for 3.5m) in a narrow corridor without hitting walls, passing through doorways without hitting walls, turning 360°, rounding a 90° corner, driving backward (0.5m) in a straight line, approaching people or furniture without bumping into them, driving people or furniture without bumping into them, driving to a specific pre-established location, turning right and left at will and upon command, planning a trip from one location to another in an efficient manner" (115) (p.220). Performance is measured on a four point of scale ranging from 1-very good); 2-needs improvement; 3-tries to perform; 4-is not able to perform, and a total score is summed as an indication of performance. The inter-rater reliability of the FERS is considered to be good (115).



Kirby et al proposed 15 categories of obstacles that could be used in an obstacle course designed to evaluate the safety and effectiveness of a wheelchair user. The proposed use of the WST is to evaluate initial status as well as any improvements in a wheelchair user's performance following rehabilitation programmes, research as well as a means of evaluation for engineers. The categories proposed by Kirby et al led to the development of the WST which consists of 33 tasks in 13 categories. The categories include "brakes, footrests, armrests, transfer, wheelchair folding, reaching, manoeuvring, doors, levels, surfaces, incline, curb and wheelies" (116) (p.14). Performance of items in these categories is scored on a three-point ordinal scale where 0-reflects a failure to complete the test criterion safely; 1-partial completion; 2-successful and safe (116). A study was conducted by Kirby et al to evaluate the reliability, validity, practicality and usefulness of the WST. The study design was a with-in subject comparison of wheelchair users' skills and their ability to perform each skill was rated on the 3-point ordinal scale. From these ratings the test-retest, intra- and interrater reliability, as well as construct validity and concurrent validity was determined. The content validity of the WST was assessed through the literature review that was conducted during test development. Further, the nine occupational therapists evaluating the participants, were asked to comment on the content, and identify any skills that should be added. The occupational therapists had clinical experience ranging from two to 19 years. The occupational therapists unanimously agreed that 30 (91%) of the 33 WST skills were relevant to evaluating performance. On this basis, the researchers determined that the WST has excellent content validity. The removal of wheelie skill was recommended by two of the occupational therapists and the removal of the curb skill and the soft-surface skills was recommended by one occupational therapist each respectively. The researchers acknowledged that these identified skills are more difficult than others and an individual's ability to perform them may be due to several key user characteristics and are not so much a reflection of the content validity of the items (116).

Harvey et al (117) proposed an obstacle course consisting of six obstacles that were determined by a group of physiotherapists over a two year period to be key tasks for the mobility of wheelchair-dependent paraplegics. The evaluation tool was later refined to consist of six key mobility tasks that ranged from simple to complex and were considered to be representative of the motor tasks learnt by wheelchair users. The tasks included: "moving from lying to sitting, completing a horizontal transfer, completing a vertical transfer, pushing a wheelchair on the flat, pushing a wheelchair up and down ramps, and negotiating kerbs in a wheelchair" (117) (p. 428). Performance is measured on a six-point ordinal scale which considers the level of assistance required, the time taken to complete the tasks and the complexity of the task. The scores are not summed for an overall score. Harvey et al have not evaluated the content validity of the evaluation tool further than relying on the development phase conducted by the physiotherapists (117).

This review of performance measures, which evaluate an individual's ability to use a wheeled device, suggest that assessment may be conducted in a variety of settings. Evidence for content validity of assessment conducted in clinical settings supports the ability to simulate certain real-world characteristics; however, cognisance should be given to the personal and contextual factors which influence performance. Certain skills that are considered to be complex may in fact be impossible due to impairment, or irrelevant to individuals participation needs or mobility demands, or otherwise easily remedied with adaptations or assistance.

### 2.6.3 Community mobility for persons with cognitive impairment

Cognition can be evaluated within a hierarchy of primary cognitive capacities (orientation, attention and memory), higher level thinking abilities (reasoning, concept formation, language comprehension and production as well as problem solving) and metaprocesses (executive function and self-awareness) (83). Dysfunction in performing ADL and IADL has been linked to cognitive impairment and mild cognitive impairment (MCI) (118–120). Performing IADL requires higher level cognitive functions and executive functions, as individuals need to make and execute plans, adapt to situations, make accurate and safe decisions as well as think abstractly. For example, an individual's ability to learn the public transport routes may support their ability to plan and execute trips to the shops and to pay their bills. Given the prevalence of executive function deficits and their association with limitations in ADL and IADL, health professionals need to assess, identify and treat these deficits (83,84,121).

The assessment of cognitive components has been criticized for the reliance on the theory that components can be separated, given that human cognition is essentially an interrelated process (83). When adopting a more functional approach to assessment, an occupational therapist may form hypotheses about which components are limiting function and later assess specific components using other selected tools. Regardless of the approach to evaluating cognition, assessment should cover all components and should take a performance-based approach, as a deficit in any component may influence executive function and thus IADL performance (84).

Executive function is necessary for the competent performance of unstructured, multistep tasks and roles. Executive function includes determining a need and formulating a goal; planning and sequencing the steps required to achieve the goal, initiating the plan into purposive action/activity, and the ability to monitor the performance and self-correct as needed (83). In Australia, Poulin et al (121) conducted a literature review of performance-based measures of executive function and their psychometric properties. From this they created a broad operational definition comprising nine components of executive function based on published executive function definitions. Further Poulin et al analysed the content of 17 tools designed to assess executive function specifically or

as part of a general assessment that occupational therapists may consider using with individual's post-CVA. They found that none of the tools assessed all components and the most common executive function components assessed were planning, sequencing, problem-solving and monitoring. Nine of the tools were conducted in naturalistic environments, three consisted of work-related table-top activities, and six comprised of table-top tests designed to predict executive problems. Two of the tools had evidence of reliability and most of the tools had evidence of validity. The tool with the strongest validity was considered to be the Assessment of Motor and Process Skills (AMPS) (121).

As the ability to perform ADL and IADL is linked to participation it is useful to research the influence of cognitive impairment on performance of ADL and IADL. In Canada, Merritt (122) conducted a retrospective study in which the AMPS was found to be a valid measure for supporting determinations of an individual's need for assistance in the community; however, it was stressed that other measures should also be used in conjunction with considerations of contextual factors in the decision-making process. Merritt proposed that additional research is required to determine the validity of using ADL measures to predict the need for assistance in the community (122). This suggests that the development of additional means of assessing independence in the community would be supported by the occupational therapist community.

Primary cognitive capacities are a pre-requisite for independent function and the absence of these capacities would require adaptation or assistance to support competent function. Evaluation and early detection of cognitive impairment and the monitoring of progression is critical to supporting optimal functioning in individuals whose capacities are at risk of deterioration (83,84,121,123). The Montreal Cognitive Assessment (MOCA) was developed as a screening tool for MCI and has been acknowledged as a more sensitive tool than the Mini Mental State Exam (MMSE) (124). Several studies have acknowledged the tool's psychometric properties and sensitivity to varying populations. The content of the MOCA was developed on a theoretical basis of its author, resulting in 30 items which can be categorised into the domains of executive function, visuo-spatial abilities, short-term memory, language, attention, concentration, working memory and spatial orientations (124–127). The MOCA was originally validated in a sample of individuals with approximately 13 years of education and it has been acknowledged that education and literacy levels may introduce bias on certain of the MOCA's subtests. The clinical utility and sensitivity of the MOCA has been researched for populations in Cape Town and South Africa. Researchers have acknowledged that evaluation of cognition in the South African context may be challenging due to South Africa's diverse cultures, language and socio-economic distribution. The relevance of screening for MCI in a South African population is considered especially relevant to detecting changes in cognition due to HIV-associated neurocognitive disorder (HAND). In a study conducted by Reuben et al

(128), the utility of the MOCA to detect neurocognitive impairment in a sample of 78 HIV positive and negative, Black, Xhosa-speaking South Africans was explored. This explorative quantitative study determined that HIV status as well as education were strong predictors of scores. Floor effects were observed in items from the visuo-spatial, language, calculation and abstraction domains. The authors determined that the MOCA requires modifications before it can be normed and validated for this population (129). A quantitative study was conducted by Joska et al (129) comparing the use of the MOCA with other cognitive impairment screening tools for the detection of HAND in 156 participants treated with anti-retrovirals (ARVs) from Cape Town, South Africa and Baltimore, in the United States of America. The study determined that screening tools tap only some cognitive abilities and that other factors may influence performance. They concluded that issues such as cultural, education and language differences may hinder evaluation efforts and although the MOCA has been shown to display a degree of sensitivity, concerns of specificity remain (129).

The MOCA-Basic (MOCA-B) has been developed by the MOCA Clinic and Institute as a screening tool to detect MCI in illiterate and low-education individuals. The validity of the MOCA-B was evaluated in a cross-sectional study conducted in Thailand, with 85 participants with less than five years of education. The participants were grouped into those who did not have reported MCI, and those with reported MCI and the absence of dementia. The results of the study determined that the MOCA-B correctly identified participants without MCI with a specificity of 86%, but had a specificity of 81% to detect MCI (130).

Disruption to the functioning of the brain can result in dysfunction of sensorimotor functions resulting in cognitive, speech and language and/or perceptual dysfunction (131). Mild communication difficulties may lead to impaired occupational function, social isolation, and mood disturbances (132). Interpersonal, communication, problem-solving and decision-making are important skills and abilities which influence an individual's participation (15,121). Executive function deficits are associated with a higher risk of functional dependence, an inability to return to work and poor social participation (83,121). Communication demands can occur in a variety of social and occupational settings, on the phone and in person, and may be prepared or impromptu in familiar and unfamiliar circumstances. Communication is therefore critical to performing ADL and IADL (132). Advances in technology has seen a greater shift to the provision of digital services supplied to a greater number of individuals, for example over the internet or by way of smartphone applications, ATM's, automated ticket systems, computers and tablets. In recognition of this shift the inclusion of personal technology use has been proposed (133) as relevant to the evaluation of an individual's performance in IADL and several approaches to the evaluation have been developed (134–137).

The impact of cognitive impairment on an individual's ability to use public transport in South Africa has been shown by Mashiri et al (138) to be influenced by a lack of access to information in appropriate formats. In a demonstration project conducted in South Africa, the needs of persons with hearing, speech and cognitive impairment were considered regarding the use of minibus taxis. The problems that were identified included (a) an inability to identify the correct vehicle for their desired destination when changing vehicles along a route, (b) communicating with the driver that they would like to board the minibus taxi and communicating with either the driver or other passengers that they would like to disembark. On this basis, it was concluded that the provision of information regarding accessibility, services and fares should be made available along routes between public transport stops, at stops and terminals as well as on route (138).

This review of performance measures, which evaluate the impact of cognitive impairment on an individual's ability to conduct tasks in the community, suggest that assessment should take an integrated approach to components of cognition. Certain executive function skills may be indicators of an individual's ability to conduct complex planning and problem-solving tasks anticipated in busy environments, however underlying impairment of primary capacities may influence an individual's executive function and performance of IADL. Further deficits in cognitive impairment may influence an individual's ability to use technology, communicate and follow cues in the environment.

#### 2.6.4 Community mobility for persons with visual impairment

Vision is a necessary function for completing most tasks of daily living (139,140). Many IADL tasks are vision-related and visual impairment can influence an individual's ability to perform these tasks. Visual impairment is evaluated according to either self-report, observed performance or an individual's visual acuity. A loss of visual acuity has been associated with physical disability, psychosocial disability and a diminished quality of life, however visual acuity impairment accounts for less than 20% of variation in participation (95,141–144). Self-reported difficulties in performing IADL have a stronger association with visual impairment when compared to ADL's. Individuals with visual impairment reported higher participation restrictions in reading (print size, street signs or instructions), mobilising outdoors, the domain of leisure and shopping, when compared to ADL (95). Performance of community mobility is therefore a good functional measure of vision (144).

The loss of contrast sensitivity, stereoacuity (SA) and visual field (VF) are indicators of visual impairment that influence mobility and balance decrements (141,145). Swenor et al (140) found that mobility limitations in older adults was associated with multiple measures of visual impairment. The incidence of limitations in walking and stair climbing were higher in participants with visual acuity, contrast sensitivity and stereo-acuity impairments (140). Correlations between visual acuity

and visual field have been correlated with travel route performance, with certain types of visual field proving to be more important for route travel than others (107). Leat and Lovie-Kitchin (145) conducted a study with 35 participants aged 20-80 years old with low vision, measuring their mobility around an indoor and outdoor mobility course. The results of the study indicated that useful visual field was an additional predictor of mobility performance; however, useful visual field scores are influenced by higher visual processing and cognitive processes (145).

As body functions such as visual acuity, contrast sensitivity, stereoacuity, visual field and useful visual field, form the foundation of the visual perceptual hierarchy, it is easy to accept that any impairment at this level would limit function (139). However, outcome measurement of improvements in visual function following intervention is difficult to capture using clinical measurements with all sub groups of visual impairment. For example, the assessment of visual acuity using a letter chart does not measure changes in function for persons with severe vision loss. For these reasons, evaluation of vision using functional activities and quality of life measures, are becoming increasingly valued. While the assessment of visual acuity has been acknowledged as a valuable screening tool, over and above testing visual acuity, performance-based measures of visual impairment should be considered when predicting functional loss or measuring quality of life (107,144).

Improving orientation and mobility (O&M) in order to support an individual's safe and efficient navigation has been identified as a primary goal of interventions aimed at persons with visual impairment (146). Orientation and mobility programs are considered a valuable means of supporting an individual's confidence in their functional and community mobility skills, through addressing visual efficiency, road safety awareness and defence as well as mobility aid use. Thus O&M programs may support an individual's improved ability to execute tasks and participation. Outcomes measures of O&M reflect the effectiveness of these programs as well as other forms of vision restoration treatments such as retinal prostheses (147).

As impairment of visual acuity is associated with slower walking pace, greater mobility difficulties and disability, it is accepted that basic assessment of walking speed and obstacle avoidance are appropriate for evaluating vision-related mobility (107,141). Visual acuity impairment should not be discounted as a predictor of participation; however, broader mental and physical health states have been found to be as significant (95). Despite the influence of these factors, there are few standardised assessments which observe O&M performance that consider the broad scope of factors which contribute to O&M. Development of assessments which evaluate an individual's O&M should consider psychosocial, physical, and environmental factors (147–149).

A scoping review of literature was not able to identify a gold standard measure of O&M, although several tools are available which report to capture vision-related IADL performance. A lack of O&M

assessment has been attributed to a lack of consensus regarding which aspects of performance should be assessed as well as the environments that are considered appropriate for assessment (107).

In the development of the Very Low Vision Orientation & Mobility (O&M-VLV) assessment, Finger et al (107) determined that evaluating an individual's ability to mobilise safely and efficiently requires determining whether they are able to detect landmarks, orientate themselves to an environment, re-orientate themselves and navigate an environment independently (107). Providing an individual with an opportunity to orientate themselves to a room, is more likely to support their feelings of safety and optimal performance (107). Safety, convenience and real-world relevance were considered important aspects in selecting the courses. The developers were not able to report on the important factors that need to be considered when replicating courses between sites (107). Finger et al stated that individuals with very low vision require the use of a mobility aid. Visual aids include sighted guides, a white cane and dog guides. These aids supplement other senses when vision is unreliable (107). Completing mobility tasks unaided is thought to provide an indication of the influence of visual impairment on performance; however, notably, does not reflect an individual's true abilities. Finger et al concluded that the use of habitual aids during assessment was appropriate for conducting measurement of real-world performance (107).

Scoring of O&M may be based on task time, travel distance, percentage of preferred walking speed, as well as accuracy in conducting tasks (107). Percentage of preferred walking speed is diminished with the increase in complexity of a travel route. Conversely, a slower walking speed may result in improved accuracy. Therefore, there are multiple measures of performance that may capture changes in performance (107). O&M specialists tend to favour first establishing an individual's self-reported activities and participation in the wider community, before identifying the components which influence performance. Both orientation and mobility are considered to bear a reciprocal influence on performance (147). A standardised measure of O&M that captures overall client performance has not been successfully developed as certain elements are difficult to capture. Some components of O&M performance are easier to capture such as walking speed or balance. Contextual factors are more difficult to measure due to the complexities (147). Deverell proposed that environments can be scaled according to six levels. These levels range from static to dynamic environments. The dynamic environments are further complicated by crowding and pace led by pedestrians and traffic, and by the state of control. Uncontrolled environments are differentiated from controlled environments by the unpredictability of traffic flow, direction or pattern which in turn results in unclear paths for movement (149). The development of a single, comprehensive O&M measure would likely prove to have poor utility. Deverell supports the

development of an approach that measures individual factors which influence performance as a means of evaluating intervention. These measures need to be conceptually consistent with O&M practice in order to be valid (149).

This review of performance measures, which evaluate the impact of visual impairment on an individual's ability to conduct tasks in the community, suggest that assessment should take a performance-based approach to functional mobility rather than an impairment focussed assessment of vision. Further, mobility and orientation to dynamic environments is a suitable criterion for performance. O&M courses designed to measure performance should be performed with the use of visual aids.

## 2.7 Conclusion

The review of literature on assessment and evaluation conducted in occupational therapy, proposes that assessment tools should rely on a conceptual framework as a foundational basis. Assessment may be conducted in either a top-down approach or bottom-up approach. Thus, an occupational therapist may first establish an individual's experience of participation through an interview, followed by enquiry into the activity limitations which influence optimal participation through observations of the skills and abilities related to the domain of performance. Conversely, an understanding of an individual's body function impairment may guide an occupational therapist's decision making regarding the approach to assessment of abilities and skills.

Assessment tools should gather reliable and valid, subjective as well as objective measures of occupational performance. In order to support the psychometric properties of the assessment tool, the content selected for an assessment tool should be relevant and representative of the domain of interest. In order to support the measurement of occupational performance, the content should be placed at an activity level rather than an impairment level, as measurement of activity and task performance in a clinical setting is a better predictor of performance in the real world.

The methodologies employed by researchers in the enquiry into the reliability and validity of the various approaches to interviews, observations and evaluation of IADL were reviewed in the literature above. The measures reviewed in this chapter were developed for the specific purpose of evaluating the influence of motor behaviour, cognitive impairment and visual impairment on community mobility, rather than an individual's ability to use public transport. Certain details as to the methodologies employed to evaluate the content validity of IADL measures referred to above were not readily available, however where possible the available considerations were included in the formulation of the method employed in validating the CoMATI. This study relies on the input of a panel of experts to determine the relevance and representation of the content used in the CoMATI; that being, the content validity of the CoMATI.



## Chapter 3: Methodology

### 3.1 Introduction

Chapter Three first presents the purpose of the CoMATI, an outline of the CoMATI's content, followed by a description of the administration of the CoMATI. Secondly, the research methodology to evaluate the content validity of the CoMATI, is described. The study design, study population and sampling are introduced. This is followed by a description of the data collection process, the Content Validity Rating Scale and data management and analyses strategies. The chapter concludes with ethical considerations and a discussion of the quality of the study.

### 3.2 The measurement instrument: CoMATI

#### **Purpose of the CoMATI**

The CoMATI may be selected by an occupational therapist as an assessment tool for evaluating the activity limitations of a PWD who is reliant on public transport for community mobility. The CoMATI specifically measures an individual's ability to independently use public transport. The primary objective of the CoMATI is to provide an occupational therapist with subjective and objective information to determine an individual's ability to function within each of the three subtasks of public transport use, as identified by the developers through activity analysis:

- To independently navigate to and from a public transport stop
- To independently embark and disembark public transport
- To travel independently on route

The secondary objectives of the CoMATI are:

- to document the individual's personal, medical and disability information as it pertains to public transport use.
- to obtain subjective information regarding the individual's occupational performance in the domains of ADL, IADL, leisure, work and education.
- to obtain subjective information regarding the individual's social, behavioural and communication function as it pertains to public transport use.
- to determine the individual's travel profile and establish which forms of public transport an individual has access to and determine their additional transport needs (availability, frequency of use, purpose and experience).
- to determine the types of assistance an individual requires to use public transport.

## Target Population

The CoMATI assesses:

- PWD of all ages, where independent community mobility is deemed an appropriate goal.
- Individuals with physical, cognitive and/or visual impairments.
- Individuals with varying levels of education, including those who have not completed any levels of school.
- Individuals who travel with/without assistive devices/attendants for mobility, or caregivers for supervision.

## Format

The CoMATI consists of:

- A standardised Interview Report Form, consisting of 34 items [Appendix A]. The CoMATI Interview Report Form provides space to document information related to the individual's personal details, medical and disability information, occupational function, experience of accessing transport as well as social, behavioural and communication function as it pertains to public transport use.
- Four objective assessment protocols, each containing graded activity items (listed from least anticipated demand to highest/advanced demand), specific instructions to administering occupational therapists and space for recording the individual's performance. Certain items are performance component based, e.g., orientation to time and place, yet the majority of the items are intended to reflect everyday functional situations that an individual may encounter when using modes of public transport or when mobilising in the community. The four protocols are: the Assessment protocol for persons that ambulate, consisting of 47 items, which assesses individuals who mobilise with or without assistive devices [Appendix B]; the Assessment protocol for persons who use a wheeled device, consisting of 42 items, which assesses individuals who mobilise using wheeled mobility device while seated [Appendix C]; the Assessment protocol for persons with cognitive impairment, consisting of 36 items [Appendix D]; and the Assessment protocol for persons with visual impairment, consisting of 23 items [Appendix E].
- An ordinal scale for rating the individual's performance of each activity item. Performance is rated as "5 - No assistance required", "4 - Requires an activity adaptation and/or assistive device/service animal", "3 - Requires assistance from a member of the public", "2 - Requires assistance from a travel companion", "1 - Requires assistance from more than one person". The ordinal scale includes a description and additional qualifiers of each rating as well as general considerations for interpretation of the scores [Appendix F].

- A descriptor of public transport use relevant to the Cape Town context [Appendix G]. Each of the three subtasks of public transport use, are presented with the demands of using a Metrorail train, Golden Arrow bus, MyCiti bus and minibus taxi.

## **Procedures**

1. The occupational therapist first follows the Interview Report Format and obtains information from the individual and/or any person that accompanies them to the assessment. The occupational therapist uses the Interview Report Format to document all the information obtained from the interview before proceeding to the objective assessment.
2. The occupational therapist selects one or more of the four available objective protocols. The selection of a protocol is based on the impairment/s related to the individual's health condition, as well as the individual's reported difficulties in accessing public transport.
3. Following completion of each item in the protocol/s, the assistive device/assistance required in an individual's performance is documented by the occupational therapist. Performance of items is rated using one rating from the ordinal scale. Space is available for additional descriptive comments that an occupational therapist may deem necessary to note.
4. In circumstances where the occupational therapist deems that the individual's circumstances, needs and abilities need further clarification, collateral information is gathered from either a person who knows the individual or from a medical report. The occupational therapist may obtain information from a family member, carer or friend; or from available and appropriate medical reports related to an individual's health condition or impairments.
5. Information obtained from the interview, the collateral source and scoring of the individual's performance on the protocol, are used to evaluate the individual's ability to perform each of the three subtasks of public transport use. The occupational therapist answers yes/no in terms of the individual's ability to independently perform each subtask. Should the occupational therapist determine the answer 'no' to one or more of these areas the individual is deemed unable to independently use public transport.
6. The occupational therapist may review the scoring of each item in order to determine where the individual may require assistance or adaptation for certain activities when using public transport.
7. The Interview Report Format and protocol/s may be re-administered following a suitable period of intervention. The purpose of repeating the protocols is to evaluate the individual's progress following intervention.

## Completion time

The CoMATI was designed to assess an individual within one to two hours. The Interview Report Format requires a minimum of 30 minutes. Assessments that include the administration of one assessment protocol require an additional 20 to 40 minutes. Assessments that include more than one assessment protocol may require more than one hour. The duration of administration is further dependent on the individual's performance during the assessment. Speed of performance, anxiety, endurance, and ability to follow instructions, are examples of factors that may impact the duration of the assessment.

## Standardisation

Standardisation implies that the results of an assessment can be consistently used (7). Currently, the CoMATI has a set procedure, however, evidence of validity, reliability and clinical applicability has not yet been established. This research is the first step to establish psychometric evidence in order to standardise the CoMATI.

The current version of the CoMATI manual includes:

- Guidance in the assessment and procedural process of the Interview Report Format and the four available protocols (as above).
- A detailed description of the tasks of independent public transport use [Appendix G].
- A list of equipment required and considerations for the assessment environment.

The developers are relying on the results of this study to refine the manual.

## 3.3 Study design

The researcher employed a quantitative, methodological research approach in this study. The methodological approach is preferable to determine content validity of the CoMATI for clinical decision-making (150). Evidence to evaluate the usefulness and appropriateness of a performance measure with an intended purpose, is based on content validity (46). The study has drawn on measurement theory, specifically, classical test theory, to evaluate the degree to which the content of the CoMATI is representative of, and relevant to, the task of public transport use (8,38,39).

In order to meet the objectives of the study and evaluate the degree of relevance and representation of the CoMATI, the researcher sought the opinion of a panel of SMEs. To establish the *relevance* of each item, agreement among SMEs was used to establish the extent to which each item is essential to evaluating an individual's ability to use public transport use. In addition to relevance, high ratings by the SMEs on domain *representation* in individual items indicate that

the items measure an important aspect of a content domain (46). The SME ratings of the items were used to determine the overall representation of the domain.

### 3.4 Subject matter experts

The criteria for selecting SMEs as described in literature, as well as considerations regarding the intended use of the CoMATI, guided the determination of inclusion criteria. Rassafiani et al (79) reported that SMEs can be differentiated from novices by their training and experience as well as their approach to clinical reasoning (79). Experts are commonly determined on the basis of their knowledge of the content, their clinical experience with the targeted population, their accreditation and peer acknowledgement (79,82). For SME recruitment, SMEs can be identified through listings of accreditations, documented certification, presentations or publication certification in a related topic area, as well as peer acknowledgement (79,82).

In reference to the literature (79), occupational therapists invited to participate in this study required a minimum qualification of a Bachelor in Occupational Therapy with at least five years of practice in research and/or clinical assessment/evaluation and/or measurement. It was considered of equal importance that each occupational therapist had valid registration with the Health Professions Council of South Africa (HPCSA) as evidence that they were presently practising as occupational therapists in South Africa.

The CoMATI is intended to assess individuals with a variety of impairments and potential community mobility limitations within an urban environment such as Cape Town. Therefore, SMEs who have experience in the field of rehabilitation, and experience working with a client base in Cape Town were included. As occupational therapists in South Africa practice in both the public and private healthcare sectors, it was considered valuable to include occupational therapists from both the public and private sectors.

There were no other inclusion criteria.

### 3.5 Sampling and sample size

Using the table of minimum acceptable CVR values ( $p=.568$ ) to demonstrate content validity in individual items developed by Lawshe's colleague Schipper (1), it was determined that SMEs in this study would consist of a panel of at least five and no more than seven SMEs (1). In addition, the researcher considered the scope and requirements of the Stellenbosch University Masters study in Occupational Therapy by dissertation to determine that at least five SMEs could be used in the panel.

The researcher was not able to identify any existing database of occupational therapists classified as SMEs or listings of occupational therapists who attended specific accredited courses on the

topic of evaluation and intervention in community mobility/public transport use. Although peer acknowledgement has been critiqued as being confounded with popularity bias (79), SMEs for this study were identified on the basis of peer acknowledgment. Popularity bias was mitigated by recruiting SMEs using the additional inclusion criteria, as well as conferring with multiple peer sources. The researcher consulted with peers familiar with the CoMATI protocol as well as the research supervisors, in order to identify possible participants. None of the occupational therapists involved in any of the developmental stages of the CoMATI were considered for inclusion. These consultations resulted in a list of seven occupational therapists who may have met the inclusion criteria.

The researcher invited all seven SMEs. The SMEs were invited in writing, by email [see Appendix H], to review the content of the CoMATI. The SMEs were provided with the Informed Consent Form [Appendix I], which included information about the study and their role as well as the steps that would occur before establishing an appointment for data collection.

Two of the seven occupational therapists invited to participate did not respond. One of the seven SMEs did not respond to the initial email or a subsequent follow-up email. The researcher became aware that the second of the two non-responsive SMEs did not have practice experience in Cape Town and therefore did not attempt further contact.

The SME recruitment phase took place between May and June 2018. The opportunity to respond and establish an appointment with the researcher remained open until the predetermined timeframe for the data analysis phase of the research. All appointments between the researcher and SMEs were set before the end of July 2018. The five occupational therapists who responded positively to participate, attended an appointment with the researcher between June and July 2018.

### 3.6 Data collection and procedure

Prior to data collection, the researcher obtained permission from the Stellenbosch University Health Research Ethics Committee (HREC) before recruiting any participants. The ethics project ID for this study is 6411 [Appendix K].

To achieve the objective of evaluating the degree to which experts agree that the content of the Interview Report Form and content of the four protocols is relevant to, and representative of the domain of public transport, the researcher followed a similar procedure for data collection for all SMEs:

1. The researcher liaised with each SME regarding a timeous date, time and venue that was suitable for the SME to complete the Content Validity Rating Forms (described in detail in

paragraph 3.6 below). The researcher made herself available for each of these appointments so that she was available for any questions regarding the CoMATI or the data collection procedure.

2. At each appointment, the researcher provided a verbal overview of the CoMATI and the intended purpose of the study. The SMEs were informed that the CoMATI is intended to measure an individual's ability to use public transport. SMEs were given an opportunity to ask any questions and receive clarity on the purpose and administration of the CoMATI and their role as an SME. The SMEs each signed the Informed Consent Form for the study [see Appendix I].
3. The SMEs were provided with sufficient information regarding the CoMATI to facilitate their review of the content and their ability to make sound judgments in their review. SME's were given the following printed documents during the review process: (1) The Informed Consent Form (2) a copy of the descriptor of public transport use and (3) a copy of the CoMATI Interview Report Form and the four protocols.
4. Each SME was presented with Content Validity Rating Forms [Appendix J is an example of the rating form used for the Assessment of persons with visual impairment]. These forms were presented as tables of the items contained in the Interview Report Format and the four protocols respectively and a corresponding Content Validity Rating Scale for each item. The SMEs were required to (a) rate how essential each of the items listed in the Interview Report Format were to the domain of public transport use and (b) rate how essential each of the items listed in the procedural content of each protocol was to the domain of public transport use. The rating forms provided additional space for feedback on responses so that SMEs could provide further rationale of their decisions, as well as any additional comments on the items.

### 3.7 The Content Validity Rating Scale

The Content Validity Rating Scale that the SMEs used to rate the relevance of each item to an individual's ability to independently use public transport, was a three-degree ordinal scale (1). The researcher considered the high number of individual items that would require rating. Therefore, the trichotomous scale was chosen so as to create a time-efficient process for SMEs and to ensure that the results of agreement were narrow and unambiguous when interpreting the relevance or representation of the items (45).

The three ratings on the scale were Essential (E); Useful but not essential (U) and Not necessary (N).

### 3.8 Data management

The researcher captured the ratings from the Content Validity Rating Forms onto an Excel spreadsheet and stored it in a folder with password protection, accessible by the researcher and the biostatistician at Stellenbosch University Faculty of Medicine and Health Sciences. The content items of the Interview Report Format and the four assessment protocols were each captured onto separate spreadsheets. On each spreadsheet, a row was assigned to each content item that was rated by the SMEs and a column was assigned for each of the five SMEs. When items received a rating of *Essential* from each of the SMEs an 'x' was marked in the field where the item and SME intersected. Ratings of *Useful but not essential* and *Not necessary* were not assigned an "x" indicator and these fields were left blank.

The completed informed consent forms and completed answer sheets have been stored in a lockable filing cabinet at the Stellenbosch University, Faculty of Medicine and Health Sciences.

The comments obtained from SMEs were compiled on a Word document. Commentary on additional items that should be considered for inclusion for the Interview Report Form and each assessment protocol were summarised. Other comments and administration queries were compiled separately, as these were deemed to support the utility and administration of the CoMATI, rather than the content validity.

### 3.9 Data analysis

Researchers analyse two types of content validity. Firstly, the content validity of individual items is analysed. Secondly, the content validity of the overall measure is calculated. Content validity of all the individual items was analysed by calculating a CVR for each item using the method described by Lawshe (1) in order to evaluate the degree of relevance of each item. Content validity for individual items was established by generating a content validity ratio (CVR) for each item on the Interview Report Form and the four protocols according to Lawshe's method. Lawshe's formula is:

$$CVR = \frac{Ne - \left(\frac{N}{2}\right)}{\frac{N}{2}}$$

where  $Ne$  = number of SMEs indicating *Essential* and  $N$  = total number of SMEs (1).

Lawshe's CVR varies between 1 and -1. When all of the SMEs agreed *Essential* the CVR computed as 1.00. When more than half but not all SME's agreed that an item is *Essential* the CVR computed between zero and 0.99. The items that were rated as *Essential* by more than half



of the SMEs have some degree of content validity. When fewer than half of the SMEs rate an item as *Essential* the CVR would be negative and would demonstrate low relevance (1).

A CVR closer to 1 indicates higher agreement between SMEs that those items are relevant to the domain of public transport use. When more than half of the SMEs agree that an item is *Essential* the item may be considered to have some degree of relevance, however the CVR will need to be considered further to establish its degree of content validity. When more than half but not all SMEs rate an item as *Essential* the remaining SMEs will have rated the item as either *Useful but not essential* or *Not necessary*. Items that obtain ratings of *Useful but not essential* may be considered to have a lesser degree of relevance to the domain of public transport use. These items may therefore influence the overall representative to the domain of public transport use and may be considered for removal or revision. Items that obtain ratings of *Not necessary* may have poor or no relevance to the domain of public transport use and may not support the content validity of the CoMATI.

As occupational therapists who were considered to be SMEs, i.e., experienced and accredited, were included in the panel, there was no reason to refute their consensus on *Essential* ratings, nor interpret that agreement was a result of all SMEs being incorrect. However, when interpreting a CVR for any item, the researcher needed to establish whether the level of agreement is above the agreement which may have occurred by chance or the differing perspectives of SMEs (1,82). To compensate for chance agreement, Lawshe provided a table of critical CVR values ( $CVR_{critical}$ ).  $CVR_{critical}$  is thus the lowest level of CVR to indicate agreement that exceeds that of chance agreement (1). According to Lawshe's calculations, for a panel of five SMEs a CVR value of .99 was required for  $CVR_{critical}$ .

Lawshe's method for determining content validity is typically used to develop measures which assess an individual's ability to perform the criteria of a specific employment role. Lawshe relied on SMEs to evaluate which work tasks were considered essential for a specific job. For this reason, Lawshe was only interested in two outcomes from the SMEs evaluation, identifying those tasks that were essential to the role and those that were not. He therefore treated data dichotomously when calculating the CVR. Using Lawshe's method, the  $CVR_{critical}$  with  $N=5$  discounts any items that are not considered to be *Essential* by all SMEs. This method of analysis therefore excludes items where the level of agreement is influenced by at least one SME rating the item as *Useful but not essential*.

When occupational therapists conduct analysis of performance, they may frame performance from different perspectives in their reasoning process. Therefore, occupational therapists may pay attention to different performance factors and frame dysfunction differently to their peers (7). As experts are able to distinguish between degrees of relevance, experts with significant years of

experience may be able to distinguish between content items which have a higher degree of relevance to frame performance of public transport use when compared to others. In distinguishing between items which are *Essential* from those that are *Useful but not essential* they may be identifying the former items as being stronger determinants of performance when compared to the latter, thus ranking them in level of relevance to one another, in addition to rating their relevance to performance as per request.

A dichotomous approach to rating, that is evident from Lawshe's calculations, has been criticised as limiting statistical choices when testing correlational hypotheses (82). Ayre & Scally in 2014 (151) and Wilson et al in 2012 (152) re-visited Lawshe's  $CVR_{critical}$  calculations. Wilson et al investigated critique from Lindell et al (153) and Stelly (154) that Lawshe's critical values for the CVR was based on the binomial distribution of dichotomous data. Wilson's outcomes on the normal approximation with trichotomous data, similar to the three-degree data in this study, resulted in variance in the critical values of CVR from Lawshe's 0,99 for  $CVR_{critical}$  with  $N=5$ , to  $CVR_{critical}$  of 0,573 with  $N=5$ . Similarly, Ayre & Scally re-calculated Lawshe's values by collapsing trichotomous data into binomial data. The result from these most recent calculations reflected only slight variance in critical values in SMEs sample sizes of eight and nine, though remained similar for all other sample sizes. The similarity between Ayre & Scally's calculations and Lawshe's tables, confirm the previous authors' argument that the tables were based on binomial data distribution.

As this study aims to identify items in the CoMATI which are relevant to public transport use, items which are considered by SMEs to be *Essential* as well as *Useful but not essential* will be differentiated from items considered to be *Not necessary*. The researcher will use the  $CVR_{critical}$  values presented by Wilson et al in order to distinguish the items which are considered to be relevant by more than half of the panel of SMEs.

In addition to individual item CVR, the overall content validity was established by calculating a content validity index (CVI) in order to evaluate the degree to which the Interview Report Format and each assessment protocol was representative of the domain of public transport use. The CVI of each procedure that an occupational therapist may conduct, i.e. the Interview Report Format and each of the assessment protocols was computed individually, as these procedures are conducted separately at the discretion of occupational therapists.

Approaches to calculating the CVI vary amongst authors (56). Lawshe suggests first removing items that do not meet the  $CVR_{critical}$ , before calculating the mean of the remaining items in the final content, however he notes that this version of CVI should not be accepted as a correlation or coefficient (1). As the objective of this study was to evaluate the relevance and representation of the items in the Interview Report Format and each of the assessment protocols, the quantification

of SMEs agreement was considered a more suitable method of computing the CVI and establishing representation.

To determine each CVI, the percentage of items deemed to be *Essential* by each SME was calculated, followed by an average calculation of each SME's rating of item relevance. The CVI was calculated as the average of these percentages. A pre-established criterion of acceptability was established by Davis in 1992 (56,82). According to Davis, for a new instrument such as the CoMATI, researchers seek 80% or better agreement among SMEs to confirm overall content validity (82).

The CVR for individual items as well as the CVI for the Interview Report Format and each of the assessment protocols is presented in Chapter 4: Results.

### 3.10 Ethical considerations

The principles of Beneficence, Non-maleficence, Confidentiality, Justice and Autonomy were upheld in this study as per the principles in the International Declaration of Helsinki (155) and the guidelines by the HPCSA Booklet 6 (156).

Beneficence involves that the benefits of health research must outweigh the risks to the research SMEs (156). The SMEs participating in this study did not benefit directly from participation in this study, however possible benefits of the study were in contributing to evidence-based knowledge base in occupational therapy practice. Validation of the CoMATI will promote fair assessment procedure and decision-making in the vulnerable population group of PWD. In addition, the occupational therapists may have confidence in determinations of performance made through using the CoMATI.

Non-maleficence requires that no harm should be inflicted on research participants (155). This research study did not harm the SMEs physically and the personal details of the SMEs were not included in data analyses or management. SMEs participation did not result in any personal or professional discrimination.

Confidentiality includes principles of privacy and confidentiality (155). The researcher honoured all SMEs privacy and confidentiality, both to adhere to the principle of confidentiality and to minimise bias throughout the research process. Any personal identifiers such as names, addresses and telephone numbers were only accessed by the researcher while establishing and executing appointments and were discarded at the end of the data collection process. The Informed Consent Forms were stored in a cabinet that is locked; only the researcher had access to these documents.

The principle of justice ensures that no participants are discriminated against (156). Respect for human beings and their circumstances is central to this principle and the researcher handled all SMEs equally, regardless of their background, gender, race or age. The information on the research study was explained to each SME in either English or Afrikaans, before they provided consent to participate in the study. The researcher answered any questions to ensure that each SME understood the study and data collection process. The consent form was made available in all SMEs' first language of English.

Lastly, though importantly, the researcher ensured that the autonomy of SMEs was respected by giving them the choice to participate in the study without undue influence on the outcome of their opinions. The SMEs all had the right to refuse to partake in the study and had the right to withdraw from the study at any time without negative consequences to them. This was explained to the SMEs. Withdrawal from the study before completion of the Content Validity Rating Forms would simply have meant that the data would not be captured. The researcher also provided an opportunity for the SMEs to ask any questions or to clarify any information about the research at any point during the data collection process.

### 3.11 Quality of research

The quality of the research presented in this study will be discussed in terms of the internal validity, external validity, reliability and objectivity of the study (48). Factors which may influence the outcome of the SMEs use of the Content Validity Rating Scale and their evaluation of items in the CoMATI, as well as influence of the researcher are discussed.

In this study, SMEs were selected on the grounds of their knowledge and experience. The SMEs selected were occupational therapists with experience, working with PWD in the context of Cape Town, therefore, SMEs may be considered to be knowledgeable in the domain of public transport and the influence of the Cape Town environment on occupational performance. To further support any gaps in their knowledge of the domain, SMEs were provided with a descriptor of public transport use in the context of Cape Town, to put the performance criteria of public transport use into measurable terms. However, in this study the construct validity of the descriptor of public transport use was not evaluated.

SMEs were selected through peer acknowledgement. As mentioned earlier in the methodology section of this document, although peer acknowledgement has been criticised as being confounded with popularity bias (79), peer recommendations were selected from multiple sources. The researcher was not able to control for popularity bias further by selecting SMEs from relevant databases. The researcher met three of the five SMEs for the first time at the appointments made for data collection. The researcher had met one of the SMEs previously at an interdisciplinary

meeting regarding Dial-A-Ride. The researcher was previously colleagues with one of the SMEs at a rehabilitation centre in Western Cape, however had not had contact with the SME since 2015. Therefore, two of the five SMEs knew the researcher to some extent, which may or may not have influenced their responses.

Attempts were made to control for the influence of third-variable problems (48). SMEs ratings of the individual items in the CoMATI occurred independently. The SMEs did not rate the items in a group and appointments were kept separate and individual. SMEs were not aware of who the other SMEs were and did not, to the researcher's knowledge, share their ratings with each other. Further, the researcher did not share the completed data collection forms of previous SMEs with any of the remaining SMEs. Therefore, the evaluations made by SMEs remained independent and were not influenced by other's opinions.

SMEs were able to ask the researcher questions about the CoMATI and the individual items that were rated. Information, over and above the preparatory information provided at the start of data collection, was provided about individual items during the data collection process. Information provided to the SMEs was limited to providing answers to questions that were asked only and any opinion on the relevance and representation of each item was withheld by the researcher. An example of a question that was received is 'What is meant by preferred method when the individual needs to carry a bag?' and the answer would then have been 'The occupational therapist can use any type of bag that the individual would usually use, like a backpack or a grocery bag'.

The researcher was present for each appointment, and as the researcher was one of the developers of the CoMATI, it is possible that the experimenter effect occurred (48). Despite the researcher's conscious efforts to remain objective, the SMEs would be able to infer that as developer and researcher, the researcher intended to obtain positive results. SMEs may have been influenced by the subject effect. To counter the possibility of SMEs being overly critical or lenient in their opinions, due to the fact that they were familiar with the purpose of their involvement, the researcher attempted to control for potential biases. The researcher encouraged SMEs not to be concerned with the outcomes of their ratings. Further the SMEs were not told how each level on the Content Validity Rating Scale would influence the content validity of the CoMATI or what the data analysis methodology of the study was. However, SMEs would have been able to make inferences that the rating *Essential* would support a more positive outcome than ratings of *Not necessary*.

The Content Validity Rating Scale used in the study was used consistently to ensure internal validity (48). Each SME was given identical forms on which to rate the individual items and used the same Content Validity Rating Scale in the same manner. All SMEs rated all of the items of the forms and there was no missing data. Inter-rater agreement between SMEs was controlled by

determining the acceptable/critical CVR values to ensure that agreement about the relevance of individual items had not occurred by chance. Further calculations regarding the CVR and CVI were published so that methods of analyses and the influence of SMEs judgments on the outcome of the study remained clear to the reader.

This study has remained explicit that the content validity of the CoMATI is specific to the context of Cape Town. Thus, the performance items that are evaluated were selected and studied for the specific purpose of evaluating an individual's ability to use public transport in the Cape Town context. Therefore, the validity of the CoMATI may not generalise to differing contexts without further analyses of how public transport varies in different settings. The content validity of the individual items and the content validity of the Interview Report Format and the four assessment protocols will be available to any occupational therapist considering the use of the CoMATI in practice. Therefore, access to the analyses and results of the study, paired with information about the descriptor of public transport use that was used as the criteria for performance, should provide occupational therapists with sufficient information to determine whether the use of the CoMATI would support obtaining valid results of evaluation within their desired context.

This chapter has presented the methodology, ethical considerations and quality of the research that was conducted to evaluate the content validity of the CoMATI. The following chapter will present the results of the study.

## Chapter 4: Results

### 4.1 Introduction

Chapter Four is presented in six subsections. The first section presents the demographics of the SMEs as per considerations of the inclusion criteria (e.g., years of practice as an occupational therapist, practice setting experience, highest level of tertiary education and experience with specific impairments). The subsequent subsections represent the results of evaluating the content validity of the Interview Report Format, and each of the assessment protocols. Each subsection presents the content validity of the individual items first and then the overall content validity. The content validity of the individual items is presented in a graph demonstrating the percentage of items which received a CVR of 1,00 compared to those that received a CVR between 0,00 and 0,99. The overall content validity is presented as the average of percentages across SMEs and the subsequent content validity index (CVI). Each section concludes with a summary of the comments made by SMEs which include suggestions for the inclusion of new content and to improve the administration and formatting of the CoMATI. The chapter concludes with a summary of the relevance and representation of items in the Interview Report Format, and each of the assessment protocols.

### 4.2 Response rate

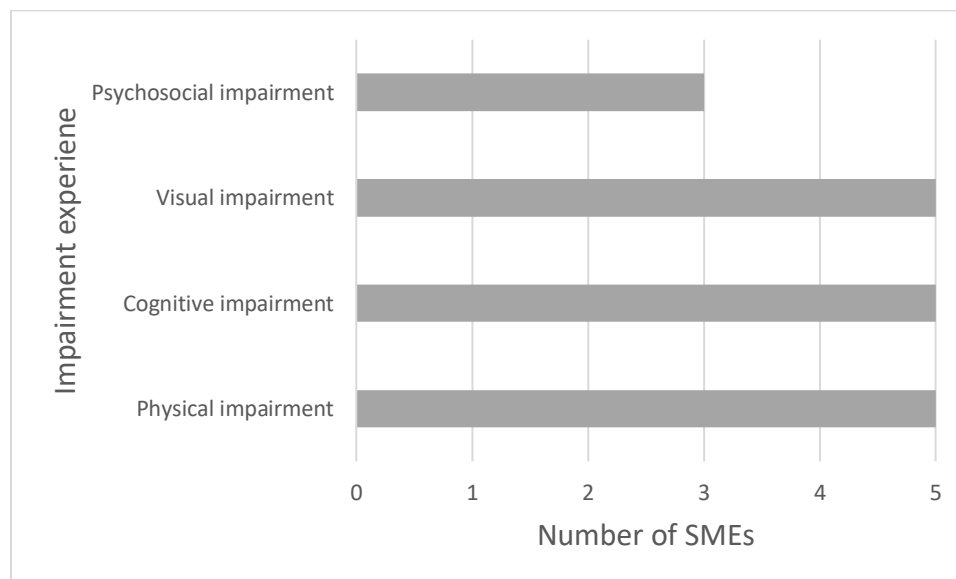
Of the seven possible SMEs invited to participate in the study, five occupational therapists responded with positive interest and completed the rating forms at a suitable time and date. All items in each questionnaire were rated and there were no missing responses.

### 4.3 Demographic information

**Table 1: Demographic Variables of SMEs (n=5)**

<b>Variable</b>	<b>Median (Min-max)</b>
Years of practice as an occupational therapist	16 (12-42)
<b>Practice setting experience</b>	<b>No. (%)</b>
Government and private sector	4 (80%)
Private sector only	0 (0%)
Government sector only	1 (20%)
<i>Total</i>	5 (100%)
<b>Highest level of tertiary education</b>	<b>No. (%)</b>
Bachelor's degree in Occupational Therapy	1 (20,0%)
Master's degree in Occupational Therapy	2 (40,0%)
Master's degree in another health and rehabilitation specialisation	2 (40,0%)
<i>Total</i>	5 (100,0%)

Table 1 shows that the minimum years of practice among the SMEs was 12 years and the maximum years was 42 years. The median years of experience of occupational therapists was higher than the minimum inclusion requirement of five years. The majority of SMEs had experience working in the public and the private sector. One SME had experience working in the public sector only with no experience in the private sector. All SMEs had a Bachelor's degree in Occupational Therapy. The majority of SMEs had a master's level of tertiary qualification, with only one SME with a Bachelor's in Occupational Therapy only. Two of the SMEs held a Master's degree in Occupational Therapy, one SME held a Master's degree in Health Systems and Services Research and one SME held a Master's degree in Rehabilitation Studies.



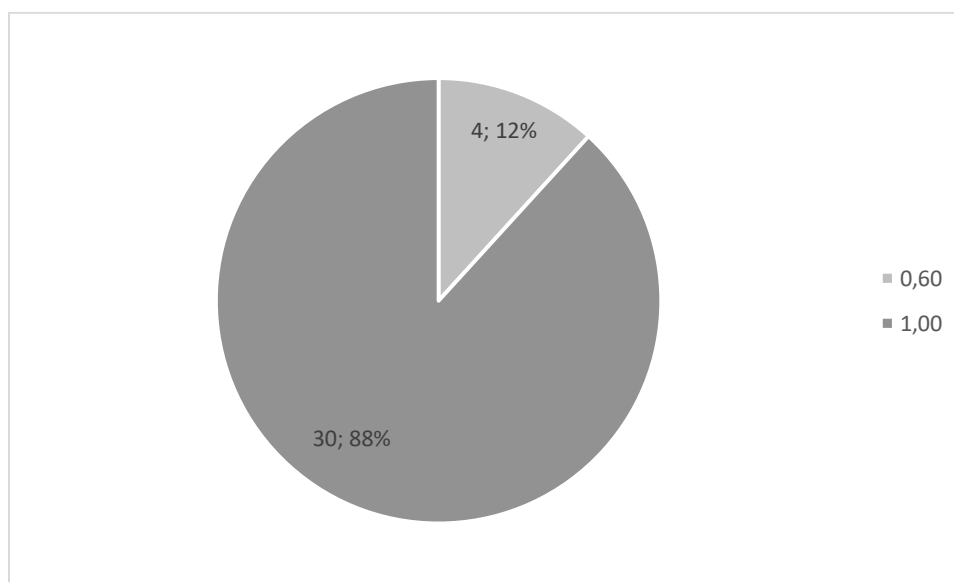
**Figure 1: The number of SMEs (n=5) with impairment-specific experience**

Figure 1 demonstrates that all of the SMEs had practice experience in the rehabilitation of physical, cognitive and visual impairments. Three of the five SMEs has experience in the rehabilitation of psychosocial impairments such as work rehabilitation, mental health and geriatrics.



## 4.4 The content validity of the Interview Report Form

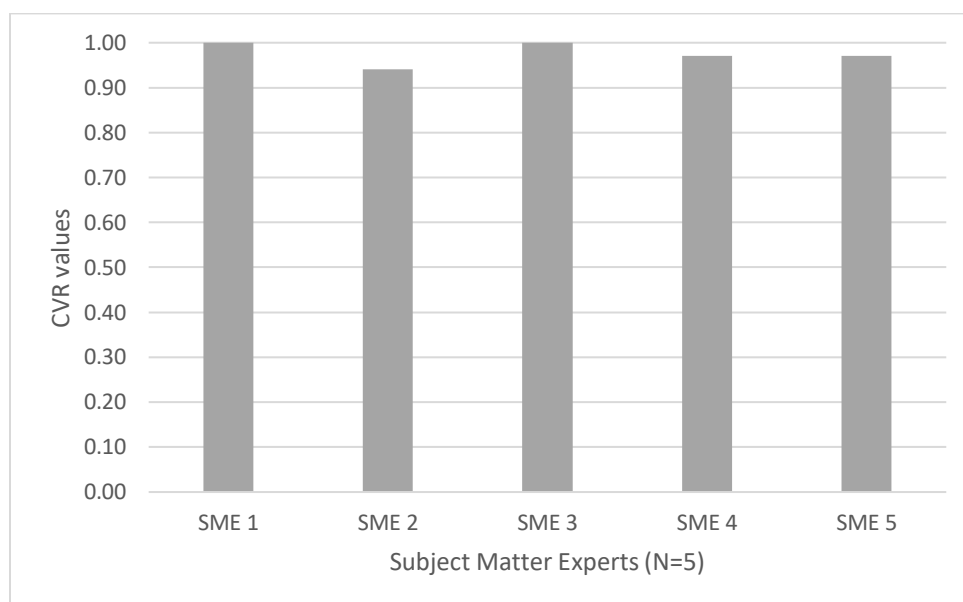
### 4.4.1 The CVR of the individual items in the Interview Report Format



**Figure 2: CVR for items (n=34) in the Interview Report Format**

Figure 2 shows the number and percentage of items in the Interview Report Format that obtained a CVR of 1,00 (88%) and 0,00 - 0,99 (12%) respectively. No items obtained a CVR of less than 0. In the Interview Report Format, 30 of the 34 items were rated *Essential* by all five SMEs and obtained a CVR of 1,00. These items may therefore be considered relevant to the domain of public transport use. Four of the 34 items in the Interview report Format were rated *Essential* by more than half of the SMEs and obtained a CVR of 0,6. These items may be considered to have some degree of relevance to the domain of public transport use. All items in the Interview Report Format met the  $CVR_{critical} = 0,573$  as per Wilson et al.

#### 4.4.2 The CVI of the Interview Report Form



**Figure 3: Individual SME (n=5) rating variance in the Interview Report Format**

Figure 3 demonstrates that SME 1 and 3 rated all items (34/34) in the Interview Report Format as *Essential*. SME 2, 4 and 5 rated less than all of the items as *Essential*. SME 2 rated 32/34 of the items as *Essential*. SME 4 and 5 rated 33/34 of the items as *Essential*.

SME 2 rated the items “Email” and “Activities of daily living” as *Useful but not essential*.

SME 4 rated the item “Leisure” as *Useful but not essential*.

SME 5 rated the item “Telephone use” as *Useful but not essential*.

There was total agreement amongst SMEs that the items in the “Disability information”, “Travel” and “Social and Behavioural Function” sections were relevant to the domain of public transport use. The CVI for the Interview Report Format is 0,98. This exceeds the acceptable CVI level by Davis (CVI=0,8).

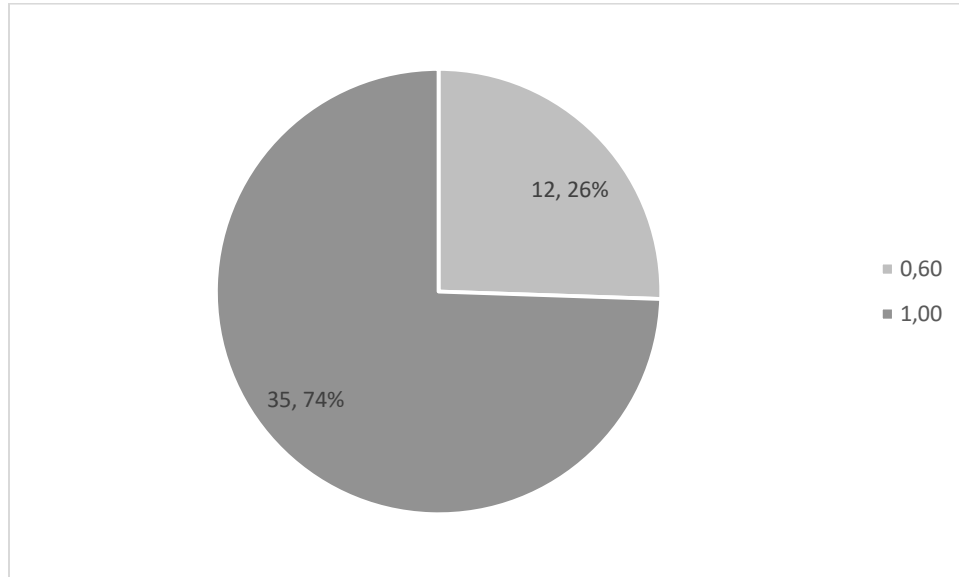
## 4.4.3 Suggestions for Interview Report Format

**Table 2: Suggestions received from SMEs (n=5) for the Interview Report Format**

<b>SME</b>	<b>Suggestions for item inclusion</b>	<b>Suggestions for administration and formatting</b>
<b>SME 1</b>	The "Travel" section should also include a rural travel category.	Obtaining a medical report would be more useful that the individual's subjective reporting on diagnosis and impairments as essential/vital information may be lacking. Official reports/documents from an audiologist, speech therapist, and an optometrist are valuable in validating reported communication and visual impairments/disability. SME 1 also queried at who's cost this would occur.
<b>SME 2</b>	<p>The "Personal details" section should also include information on an individual's financial status/means as well as support network and family structure.</p> <p>The "Disability information" section should include information on an individual's use of a caregiver and assistive devices used.</p> <p>The "Travel" section should include cost factors in the in order to determine what the individual can afford to use.</p>	<p>The section "Disability information" should not be called this, but rather "Medical information" to make it more congruent with the ICF.</p> <p>The item "Support Network" in the section "Occupational function" needs clarification as it is not clear whether it is related to social function.</p> <p>"Activities of daily living" are community tasks, such as leisure, work and education. SME 2 suggested that "Activities of daily living" should be renamed to "Personal care" for clarity.</p>
<b>SME 3</b>	<p>A subjective report on the individual's exact daily programme in the "Occupational function" section may be helpful in identifying what/how much time an individual is really spending on each area of function.</p> <p>The "Travel" section should include air travel for higher level functioning clients.</p>	None.
<b>SME 4</b>	None.	None.
<b>SME 5</b>	None.	None.

#### 4.5 The content validity of the Assessment protocol for persons who ambulate

##### 4.5.1 The CVR of the individual items in the Assessment protocol for persons who ambulate

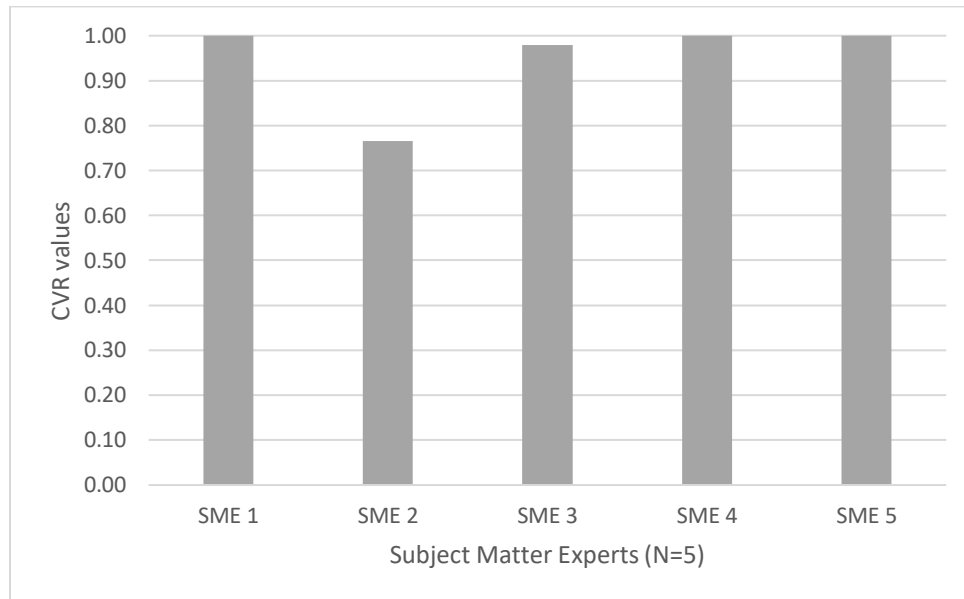


**Figure 4: CVR for items (n=47) in the Assessment protocol for persons who ambulate**

Figure 4 shows the number and percentage of items in the Assessment protocol for persons who ambulate that obtained a CVR of 1,00 (74%) and 0,00-0,99 (26%) respectively. No items obtained a CVR of less than 0.

In the Assessment protocol for persons who ambulate, 35 of the 47 items were rated *Essential* by all five SMEs and obtained a CVR of 1,00. These items may therefore be considered relevant to the domain of public transport use. Twelve of the 47 items in the Assessment protocol for persons who ambulate were rated *Essential* by more than half of the SMEs and obtained a CVR of 0,6. These items may therefore have some degree of relevance to the domain of public transport use. All items in the Assessment protocol for persons who ambulate met the  $CVR_{critical} = 0,573$  as per Wilson et al.

#### 4.5.2 The CVI of the Assessment protocol for person who ambulate



**Figure 5: Individual SME (n=5) rating variance in the Assessment protocol for persons who ambulate**

Figure 5 demonstrates that SME 1, 4 and 5 rated all items (47/47) in the Assessment protocol for persons who ambulate as *Essential*. SME 2, 4 and 5 rated less than all of the items as *Essential*. SME 2 rated 36/47 of the items as *Essential* and SME 3 rated 46/47 of the items as *Essential*.

SME 2 rated all three items in the “Environmental Awareness” section as well as the items “Lean forward, resting your chin on your thighs. Then sit up again”, “Lean forward as far as you can go, bringing your head to your knees. Then straighten up again”, “Walk across a firm surface at a rapid pace and a preferred method for a short distance”; “Walk across a loose surface at a preferred pace and method for a short distance, turn around and walk back”; “Step up and down a cut curb”; “Step up and down a curb”; “Walk up an incline across a firm surface”; and “Walk down an incline across a firm surface” as *Useful but not essential*. SME 3 rated the item “Rotate trunk to the left and right” as *Useful but not essential*.

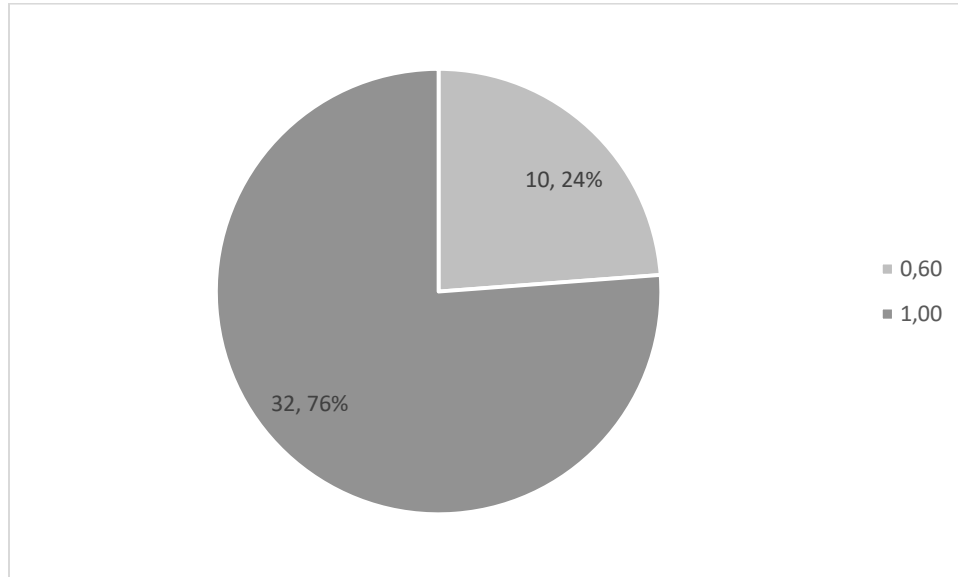
There was total agreement amongst SMEs that the items in the “Transition movements”, “Upper limb function”, “Indoor walking”, “Outdoor walking”, “Steps” and “Endurance” sections were relevant to the domain of public transport use. The CVI for the Assessment protocol for persons who ambulate is 0,95. This exceeds the acceptable CVI level by Davis (CVI=0,8).

## 4.5.3 Suggestions for the Assessment protocol for persons who ambulate

**Table 3: Suggestions received from SMEs (n=5) for the Assessment protocol for persons who ambulate**

<b>SME</b>	<b>Suggestions for item inclusion</b>	<b>Suggestions for administration and formatting</b>
<b>SME 1</b>	<p>The “Indoor walking” section should also include “Open a door, walk through a hinged doorframe with the therapist. Close the door”.</p> <p>The wording “...head to your knees” in the “Standing” section should be rephrased to “...head towards your knees” as not all individuals may be able to achieve the first.</p>	<p>The wording “...resting chest on thighs” in the “Sitting” section read like clinical assessment and not functional assessment. “reaching for item on the floor from sitting position” was offered as an alternative phrase.</p> <p>What type of surface should the standing assessment be performed on?</p> <p>What type of surface should the sitting assessment be performed on?</p> <p>Background information should be given on why a broomstick is used so that the occupational therapist understands that it is to simulate grab rails that are available on certain modes of transport.</p> <p>What is the minimum walking distance in the “Indoor walking” section?</p> <p>Clarity is needed regarding what type of bag should be used in the “Carrying” section.</p>
<b>SME 2</b>	None.	Scoring Endurance is not an actual assessment task and although relevant, as a clinical judgment call it should not be included in the protocol, but rather documented elsewhere.
<b>SME 3</b>	<p>The “Walking on an uneven incline and decline” should also be included in the “Outdoor walking” section.</p> <p>“Carrying over an uneven incline and decline” should also be included in the “Carrying section”.</p>	None.
<b>SME 4</b>	None.	The high step used in the assessment is 35cm and it is suggested that it should be 45cm to reflect the minibus taxi front passenger seat specifications as per the descriptor of public transport use.
<b>SME 5</b>	None.	Clarity is required regarding what is meant by “preferred pace”.

- 4.6 The content validity of the Assessment protocol for persons who use a wheeled device
- 4.6.1 The CVR of the individual items in the Assessment protocol for persons who use a wheeled device

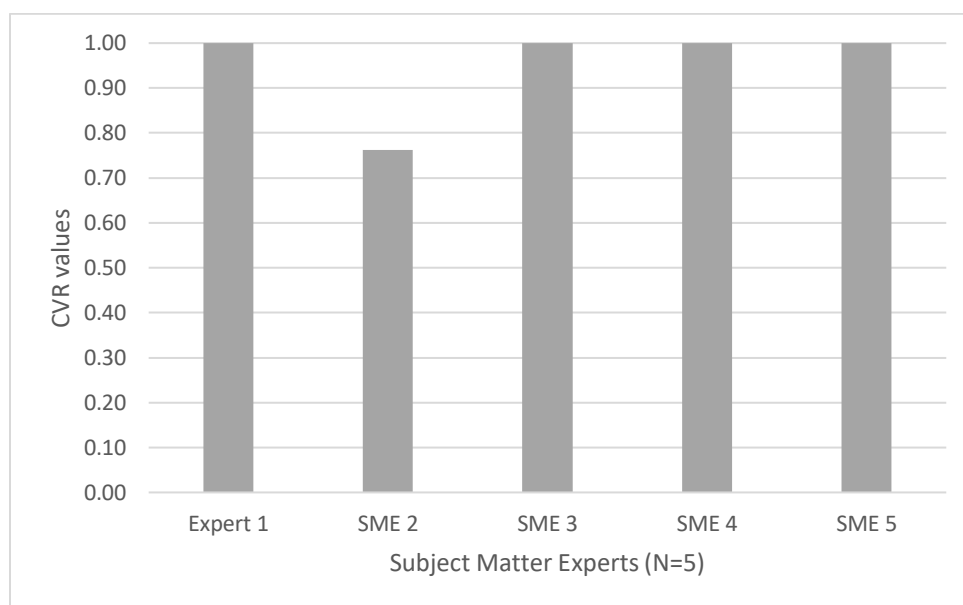


**Figure 6: CVR for items (n=42) in the Assessment protocol for persons who use a wheeled device**

Figure 6 shows the number and percentage of items in the Assessment protocol for persons who use a wheeled device that obtained a CVR of 1,00 (76%) and 0,00-0,99 (24%) respectively. No items obtained a CVR of less than 0.

In the Assessment protocol for persons who use a wheeled device, 32 of the 42 items were rated *Essential* by all five SMEs and obtained a CVR of 1,00. These items may therefore be considered relevant to the domain of public transport use. 10 of the 42 items in the Assessment protocol for persons who use a wheeled device were rated *Essential* by more than half of the SMEs and obtained a CVR of 0,6. These items may be considered to have some degree of relevance to the domain of public transport use. All items in the Assessment protocol for persons who use a wheeled device met the  $CVR_{critical} = 0,573$  as per Wilson et al.

#### 4.6.2 The CVI of the Assessment protocol for persons who use a wheeled device



**Figure 7: Individual SME (n=5) rating variance in the Assessment protocol for persons who use a wheeled device**

Figure 7 demonstrates that SME 1, 3, 4 and 5 rated all items (42/42) in the Assessment protocol for persons who ambulate as *Essential*. SME 2 rated less than all of the items as *Essential*. SME 2 rated 32/42 of the items as *Essential*.

SME 2 rated all three items in “Environmental Awareness” section, all three items in “Pressure relief”, all three items in “Advanced skills” section as well as the items “Sit in wheeled device with backrest” and “Propel across a firm surface at a rapid pace and for a short distance. Bring the wheelchair to a stop as quickly as possible when instructed” as *Useful but not essential*.

There was total agreement amongst SMEs that the items in the “Transfers”, “Sitting in a chair”, “Upper limb function”, “Indoor Propulsion” and “Endurance” sections were relevant to the domain of public transport use. The CVI for the Assessment protocol for persons who use a wheeled device is 0,95. This exceeds the acceptable CVI level by Davis (CVI=0,8).



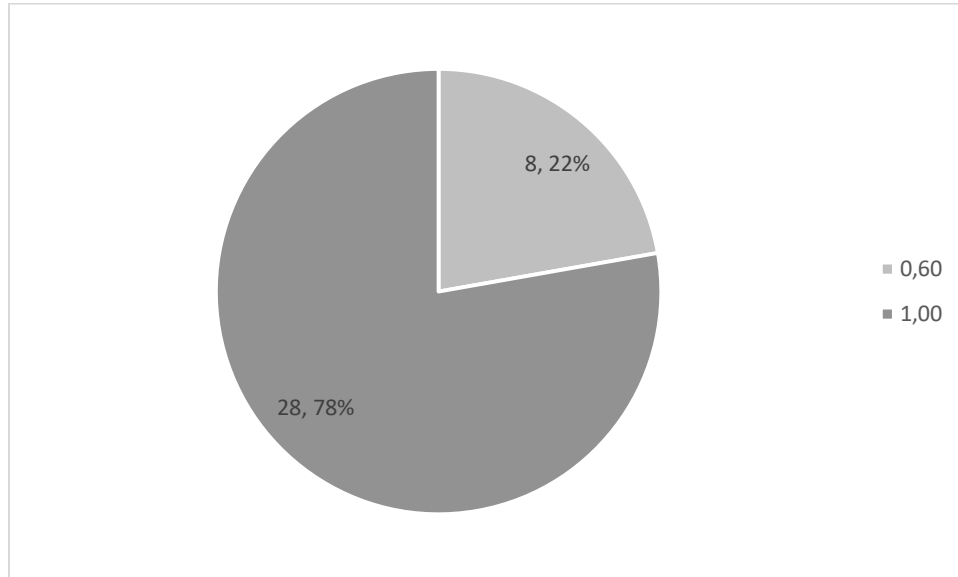
#### 4.6.3 Suggestions for the Assessment protocol for persons who use a wheeled device

**Table 4: Suggestions received from SMEs (n=5) for the Assessment protocol for persons who used a wheeled device**

<b>SME</b>	<b>Suggestions for item inclusion</b>	<b>Suggestions for administration and formatting</b>
<b>SME 1</b>	None.	The wording "...resting chest on thighs", in the "Sitting in wheeled device" section, seems like clinical assessment and not functional assessment. "...towards your knees" was offered as an alternative phrase.
<b>SME 2</b>	None.	Testing "sit in wheeled device with backrest, with or without armrests" is a test of postural stability and not sitting.  The wording "slight gradient" in the directions in the "Transfer" section should be more explicit so that it is understood that the transfer should occur across two surfaces where one is lower, and one is higher.
<b>SME 3</b>	None.	None.
<b>SME 4</b>	None.	None.
<b>SME 5</b>	None.	In the items that direct the client to "take a wallet from the therapist at shoulder height" it should be clearer that the wallet should be held at the client's shoulder height and not the therapists.

#### 4.7 The content validity of the Assessment protocol for persons with cognitive impairment

##### 4.7.1 The CVR of the individual items in the Assessment protocol for persons with cognitive impairment

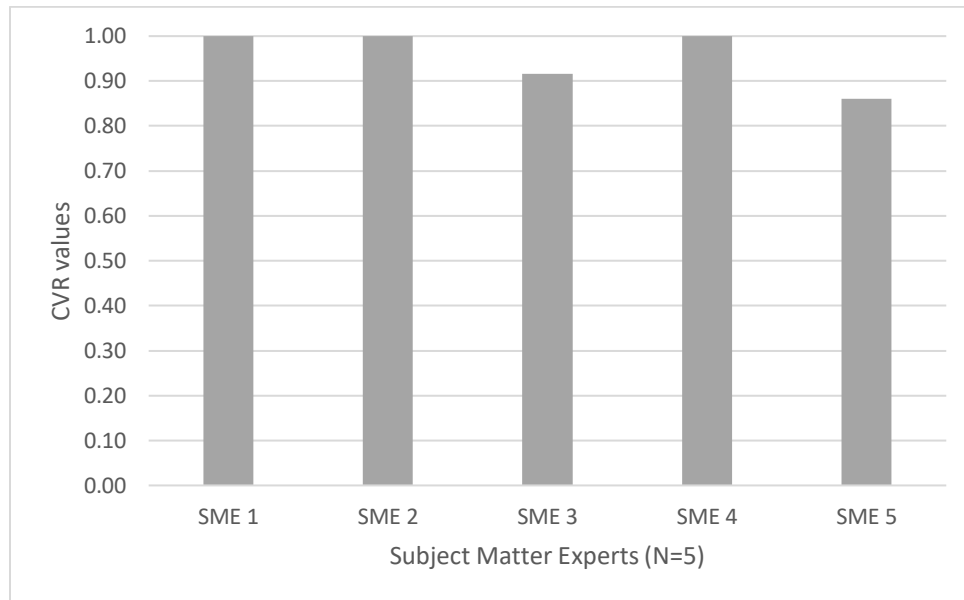


**Figure 8: CVR for items (n=36) in the Assessment protocol for persons with cognitive impairment**

Figure 8 shows the number and percentage of items in the Assessment protocol for persons with cognitive impairment that obtained a CVR of 1,00 (78%) and 0,00-0,99 (22%) respectively. No items obtained a CVR of less than 0.

In the Assessment protocol for persons with cognitive impairment, 28 of the 36 items were rated *Essential* by all five SMEs and obtained a CVR of 1,00. These items may therefore be considered relevant to the domain of public transport use. Eight of the 36 items in the Assessment protocol for persons with cognitive impairment were rated *Essential* by more than half of the SMEs and obtained a CVR of 0,6. These items thus have some degree of relevance to the domain of public transport use. All items in the Assessment protocol for persons with cognitive impairment met the  $CVR_{critical} = 0,573$  as per Wilson et al.

#### 4.7.2 The CVI of the Assessment protocol for persons with cognitive impairment



**Figure 9: Individual SME (n=5) rating variance in the Assessment protocol for persons with cognitive impairment**

Figure 9 demonstrates that SME 1, 2 and 4 rated all items (36/36) in the Assessment protocol for persons with cognitive impairment as *Essential*. SME 3 and 5 rated less than all the items as *Essential*. SME 3 rated 33/36 of the items as “Essential” and SME 5 rated 31/36 of the items as *Essential*.

SME 5 rated both items in “Cell phone use” section, Image 2 in the “Identifying Signs” section and the items “STOP” and “Post office” in the “Reading” section as *Useful but not essential*.

SME 3 rated the items Home city and Year in the “Orientation” section and Image 3 in the “Identifying signs” section as *Useful but not essential*.

There was total agreement amongst SMEs that the items in the “Time”, “Money management”, “Immediate recall of directions”, “Environmental awareness”, “Immediate recall of visual information”, “Pedestrian safety”, “Delayed recall of information” and “Executive function” sections were relevant to the domain of public transport use. The CVI for the Assessment protocol for persons with cognitive impairment is 0,96. This exceeds the acceptable CVI level by Davis (CVI=0,8).

### 4.7.3 Suggestions for the Assessment protocol for persons with cognitive impairments

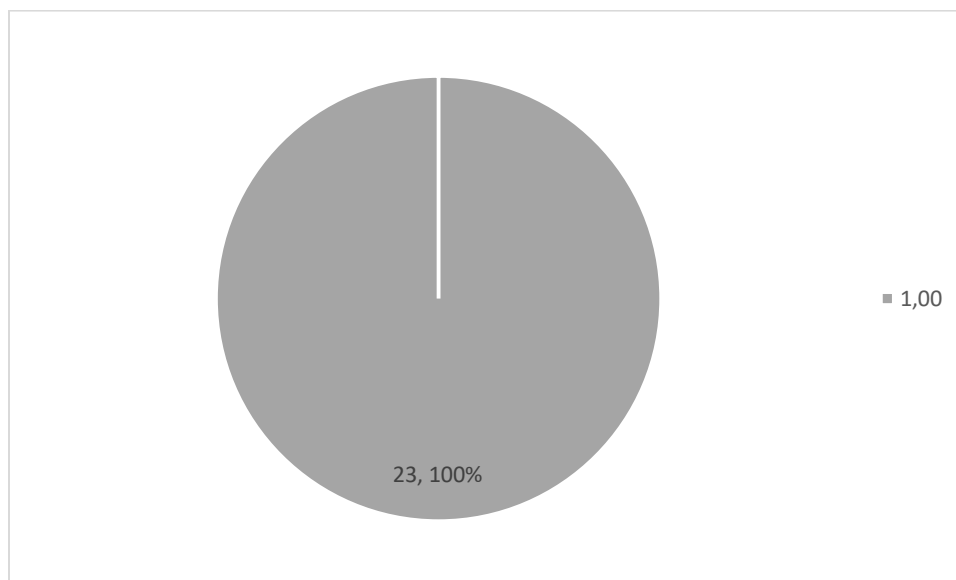
**Table 5: Suggestions from SMEs (n=5) for the Assessment protocol for persons with cognitive impairment**

<b>SME</b>	<b>Suggestions for item inclusion</b>	<b>Suggestions for administration and formatting</b>
<b>SME 1</b>	None.	<p>Clarity is required on what the CoMATI is trying to establish by testing orientation to <u>Home city</u>, as Home address is also tested.</p> <p>An occupational therapist using the CoMATI would benefit from information regarding what is being established in the “Time” section and what the individual needs to do. For example, when asked to tell the time, are they required to take out a cell phone or read the time from a nearby clock?</p> <p>The assessment of cell phone use is only essential when applicable as not all individuals use a cell phone.</p> <p>In the “Identifying signs” section, instructions to the individual should be expanded as it is not clear whether the individual’s ability to identify the sign or knowledge of what to do when they see the sign is being tested.</p> <p>Using the wording “...adhering to safe traffic rules” in the section “Environmental awareness” and the wording “...safety precautions” in the “Pedestrian safety” section is not wording that will work universally within the context of South Africa. Should occupational therapists change the wording in order to be understood this may influence inter-rater reliability.</p> <p>It is not clear whether literacy or perceptual reading ability is being tested in the “Reading” section. SME 1 suggested providing the words in a variety of font sizes if testing for literacy.</p>
<b>SME 2</b>	None.	None.
<b>SME 3</b>	Items which assess whether the individual is able to access their phone by using a pin and how the individual	The item “You are attending a meeting at 3 ‘o clock. It takes you 30 minutes to get there. What is the latest time you can leave to be on time for the meeting?” requires more

	obtains data or airtime if needed, should be included.	<p>context as individuals may reason that they require more time to ensure they are early. How does assessment of the “Money management” section occur when adaptations for money management are already in place. For example, if the individual already has a family member sort out the exact amount of money for them on a daily basis. For this reason, SME 1 commented that this section is not always applicable to every client assessed.</p> <p>The “Immediate recall of directions” section is valuable for testing language comprehension and overall cognition.</p> <p>The items in the “Executive function” section were contextual which was valuable for assessment in the South African context.</p>
<b>SME 4</b>	None.	None.
<b>SME 5</b>	None.	The assessment of cell phone use is only essential when applicable as not all individuals use a cell phone.

#### 4.8 The content validity of the Assessment protocol for persons with visual impairment

##### 4.8.1 The CVR of the individual items in the Assessment protocol for persons with visual impairment

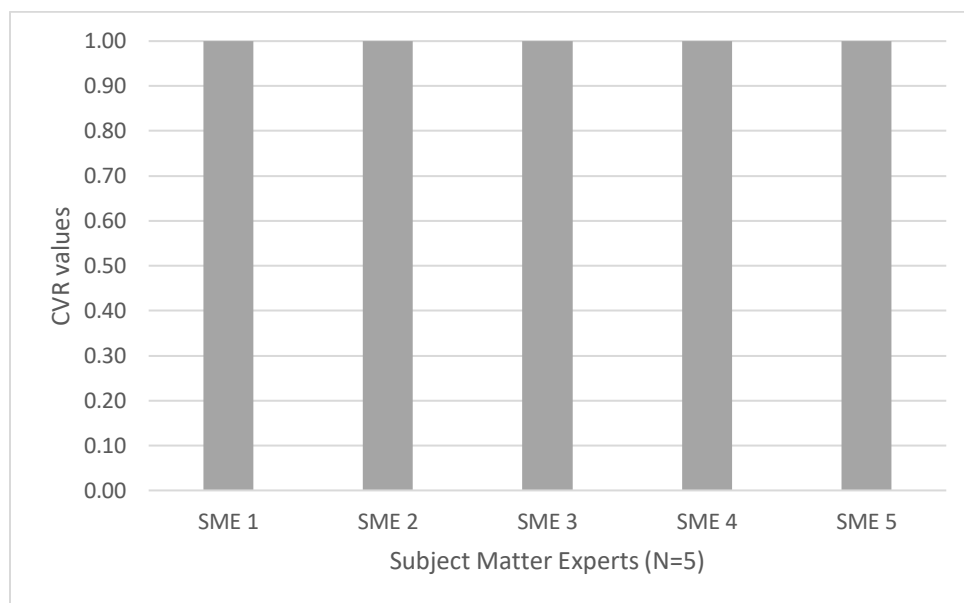


**Figure 10: CVR for items (n=23) in the Assessment protocol for persons with visual impairment**

Figure 10 shows the number percentage of items in the Assessment protocol for persons with visual impairment that scored 1,00 (100%).

In the Assessment protocol for persons with visual impairment, all items were rated *Essential* by all five SMEs and obtained a CVR of 1,00. These items are therefore relevant to the domain of public transport use. All items in the Assessment protocol for persons with cognitive impairment met the  $CVR_{critical} = 0,573$  as per Wilson et al.

#### 4.8.2 The CVI of the Assessment protocol for persons with visual impairment



**Figure 11: Individual SME (n=5) rating variance in the Assessment protocol for persons with visual impairment**

Figure 11 demonstrates that all SMEs rated all items (23/23) in the Assessment protocol for persons with visual impairment as *Essential*.

The CVI for the Assessment protocol for persons with visual impairment is 1,00. This exceeds the acceptable CVI level by Davis (CVI=0,8).

### 4.8.3 Suggestions for the Assessment protocol for persons with visual impairments

**Table 6 Suggestions from SMEs (n=5) for the Assessment protocol for persons with visual impairment**

<b>SME</b>	<b>Suggestions for item inclusion</b>	<b>Suggestions for administration and formatting</b>
<b>SME 1</b>	None.	<p>Using the wording "...navigate an unfamiliar environment" in the "Asking for assistance" section is not wording that will work universally within the context of South Africa. Should occupational therapists change the wording in order to be understood this may influence inter-rater reliability.</p> <p>It is difficult to differentiate which functional tasks in <i>Scenario 1</i> correspond to the items in <i>Orientation to a familiar environment</i>, <i>Reading and Money management</i> sections which requires rating. For clarity purposes the layout of the scenario and each section should be changed so that the sections are presented after each relevant functional task.</p> <p>Assessment of cell phone use is only essential when applicable as not all individuals use a cell phone.</p> <p>It would be helpful to the occupational therapist if examples of obstacles to be used in the assessment were provided as it is not clear that the obstacles should be typical outdoor obstacles.</p>
<b>SME 2</b>	None.	None.
<b>SME 3</b>	None.	Instead of all fonts presented on one page for the "Reading" section, each font size should be placed on different pages, starting with the smallest so that larger fonts are presented as required.
<b>SME 4</b>	None.	None.
<b>SME 5</b>	None.	<p>Why are different font sizes used in the "Reading" section as the ability to read small font sizes is not as relevant to public transport use as reading in a busy environment is?</p> <p>Assessment of cell phone use is only essential when applicable as not all individuals use a cell phone.</p>



## 4.9 Summary of the relevance and representation of the Interview Report Format and the assessment protocols

**Table 7 Summary of average agreement from SMEs and the CVI in the CoMATI**

Content	SME 1 % agreement	SME 2 % agreement	SME 3 % agreement	SME 4 % agreement	SME 5 % agreement	CVI
Interview Report Format	1,00	0,94	1,00	0,97	0,97	0,98
Assessment protocol for persons who ambulate	1,00	0,77	0,98	1,00	1,00	0,95
Assessment protocol for persons who use a wheeled device	1,00	0,76	1,00	1,00	1,00	0,95
Assessment protocol for persons with cognitive impairment	1,00	1,00	0,92	1,00	0,86	0,96
Assessment protocol for persons with visual impairment	1,00	1,00	1,00	1,00	1,00	1,00

To summarise this chapter, the content of the Interview Report Format was considered to have high relevance by two of the SMEs. The percentage of the items deemed to have higher relevance by the three remaining SMEs ranged from 94-97%. Therefore, all items were considered to be representative of the domain of public transport use and a high percentage of items were considered to be relevant to the domain of public transport use. The remaining items were deemed to be *Useful but not essential* and may not be as relevant, however these items met the  $CVR_{critical}$  and therefore may be considered to be valid.

The content of the Assessment protocol for persons who ambulate was considered to have high relevance by three of the SMEs. The percentage of the items deemed to have higher relevance by the two remaining SMEs ranged from 77-98%. Therefore, all items were considered to be representative of the domain of public transport use and a high percentage of items were considered to be relevant to the domain of public transport use. The remaining items were deemed to be *Useful but not essential* and may not be as relevant, however these items met the  $CVR_{critical}$  and therefore may be considered to be valid.

The content of the Assessment protocol for persons who use a wheeled device was considered to have high relevance by four of the SMEs. The percentage of the items deemed to have higher relevance by SME 2 was 76%. Therefore, all items were considered to be representative of the domain of public transport use and a high percentage of items were considered relevant by the majority of SMEs. SME 2 rated certain items as *Useful but not essential*, however these items met the  $CVR_{critical}$  and therefore may be considered to be valid.

The content of the Assessment protocol for persons with cognitive impairment was considered to have high relevance by three of the SMEs. The percentage of the items deemed to have higher relevance by the two remaining SMEs ranged from 86-92%. Therefore, all items were considered to be representative of the domain of public transport use and a high percentage of items were considered to be relevant to the domain of public transport use. The remaining items were deemed to be *Useful but not essential* and may not be as relevant, however these items met the  $CVR_{critical}$  and therefore may be considered to be valid.

The content of the Assessment protocol for persons with visual impairment was considered to be relevant by all of the SMEs. The overall CVI (1,00) of the Assessment protocol for persons with visual impairment demonstrates the representation of the domain of public transport. Therefore, the content of the Assessment protocol for persons with visual impairment was considered to be relevant and representative to the domain of public transport use.

To conclude, content validity of all items that were evaluated in the Interview report Format and each of the four assessment protocols was established. As a result, the comments from SMEs may be incorporated and the CoMATI may be tested and evaluated for additional psychometric properties.

## Chapter 5: Discussion

### 5.1 Introduction

Chapter Five will discuss the content validity of the CoMATI as determined in this study. The relevance of items will be discussed first in reference to the variance in years of experience and process of clinical reasoning expected from each SME. The items that were rated as *Useful but not essential* by one of the five SMEs warrant some discussion regarding their relevance and clarity, as well as how they contribute to representation of public transport use.

### 5.2 The content validity of the CoMATI in the context of the Cape Town metropole

All items in the CoMATI were considered to have some degree of content validity. Items in the CoMATI can be differentiated between those items that were considered to be relevant by the full panel of SMEs and those items that were considered to have a lesser degree of relevance by one of the five SMEs. As per the ICF (58) an individual's dysfunction in the use of public transport can be viewed as a reflection of underlying body structure and function impairments, activity limitations and the contexts in which performance occurs. Items considered to have less relevance to determining activities limitations to public transport use, may relate to the impairment level of dysfunction, while other items may not be contextually relevant to all individuals. These findings are in line with the literature that occupational therapy assessment and evaluation should be contextually relevant. These findings are also aligned with practices in evaluation of motor, cognitive and visual impairments that are performance-based and task-oriented (103,107,130).

The aim and objectives of the study have been met, as the extent to which each item of the CoMATI is *relevant* to independent public transport use has been determined and all items can be considered to be *representative* of the functional performance necessary for independent use of public transport.

### 5.3 Varied responses of SMEs

Occupational therapists with more years of clinical experience may have a greater ability to differentiate between items of relevance and irrelevance and are considered to be experts (7,79,80). Further, Slater and Cohn propose that occupational therapists develop degrees of expertise as their ability to rely on clinical reasoning and experience develops (80). However, determining how many years of experience differentiates a novice occupational therapist from an expert occupational therapist continues to be explored and at present a minimum of five years is considered acceptable. The results of this study support these theoretical assumptions to some

degree. SME 2, whom had the most years of experience, demonstrated a frequency of differentiating between relevant and irrelevant items. SME 2 also determined that all of the items in two protocols were relevant to public transport use and identified that some items in the Interview Report Format and the two remaining protocols as having a lesser degree of relevance (i.e., *Useful but not essential*). Therefore, the SME with the most years of experience differentiated the degrees of relevance between the most items in the CoMATI. Conversely, SME 1 had more years of experience than the median years of experience in the panel and determined that all of the items in the Interview Report Format as well as all four protocols were relevant to public transport use. Although SME 1 did not differentiate between different degrees of relevance between the items, SME 1 did raise several considerations regarding the presentation of items in the CoMATI as well as suggestions to make the relevance to public transport use clearer. Experts are selected on the basis of their knowledge of the domain being evaluated (79,82). Further, occupational therapists approach clinical reasoning and problem analysis from different frames of reference. These perspectives may influence an occupational therapists decision-making and approach to framing a problem (7). Although both SME 1 and 2 may be considered experts as per the definitions and criteria determined in the literature, their approaches to rating the items clearly differed. The inconsistencies in the decision-making is in conflict with the literature that indicates that experts should demonstrate higher degree of consistency when differentiating between relevant and irrelevant items (79). The rating variations between SME 1 and 2 may be further explained should deeper enquiry to each SMEs clinical experience be explored, however this is beyond the scope of the study.

#### 5.4 Items rated as Useful but not Essential and activity limitations

The researcher reviewed the items rated to have less relevance to the domain of public transport use by the SMEs (i.e., *Useful but not essential*) and the corresponding literature. Evidently, certain items may be of less relevance to determining the activity limitations which influence an individual's performance, (e.g., bending forward to pick up an object from the ground), when compared to items more representative of body structures and functions which influence performance, e.g., range of movement in the hip joint.

Items in the Assessment protocol for persons who ambulate have less relevance to public transport use according to SME 2. Aligned with the literature on assessment of balance and gait, several of these tools have not published clear and comprehensive methods for the development of the content of such tools. As the content validity of similar assessments is thus limited in the literature, it is difficult to determine whether the validity of these items used in the CoMATI can be substantiated further. Essentially, the items are considered not to provide information that is as relevant to evaluation as the other items in the protocol. Further, SME 1, although acknowledging

the items as relevant, commented that these items read like clinical assessment and not functional assessment. From an occupational therapy perspective, activity analysis of the items “Lean forward, resting your chest on your thighs. Then sit up again”, “Rotate trunk to the left and right. Move just out of base of support” and “Lean forward as far as you can go, bringing your head to your knees. Then straighten up again”, may indicate that these items have specific criteria for performance which are dependent on the individual’s range of movement in the hips and trunk. For example, setting a criterion that requires an individual to place their chest on their thighs, suggests that should the individual place their chest on their thighs, they may be scored a 5. From the perspective of the ICF an inability to bring the chest to the thighs is a better reflection of capacity, rather than performance. SME 1 proposed rephrasing the items to direct the individual to reach for an object on the floor from the starting position. Including a functional task of picking up an object from the floor may improve the relevance to public transport use, as an individual may need this type of incidental assistance while on route. Further, rephrasing these items may provide a performance-based criterion to the item rather than relying on evaluation of capacity or range of movement.

SME 2 rated additional items in the Assessment protocol for persons who ambulate as less relevant to public transport in the Carrying section of the protocol. SME 2 commented that observing an individual walk across a firm surface, at a preferred pace and method, for a short distance, and perform the various stair climbing tasks while carrying a bag, was more relevant to public transport use when compared to tasks that required the individual to carry a bag at a rapid pace, across a loose surface, or while negotiating cut curbs, curbs, inclines and declines. None of the assessments reviewed in the literature include walking while carrying objects or bags as performance-based tests, therefore it is difficult to compare the validity of these items to past studies. However, from an occupational therapy perspective, an occupational therapist will have had an opportunity to observe the individual performing similar outdoor walking tasks without carrying a bag, and therefore SME 2 may have considered observing the individual carry a bag while performing these tasks to be less relevant than previous observations. Further, difficulties with carrying a bag while performing certain of these tasks is useful to the clinical reasoning process but may not necessarily exclude an individual from using public transport. Conversely, SME 3 considered all items in the Carrying section to be relevant and felt that carrying a bag over an uneven decline and incline should be included as well. These differing perspectives on which performance-based tasks are more relevant, may be prompted by the perspectives of the SMEs conducting the rating. While SME 2 appears to be of the opinion that negotiating incline and declines while carrying a bag is of less relevance, SME 3 supports observing an individual negotiate an uneven incline and decline. These perspectives on relevance may be relying on differing assumptions about environmental demands.

In the Assessment protocol for persons who use a wheeled device, the item “Sit in wheeled device with backrest, with or without armrests” may be considered to have less relevance to public transport use as, as suggested by SME 2, the item is more a reflection of the individual’s postural stability or the degree of postural support afforded by the wheeled device. As discussed in the literature, when occupational therapists evaluate an individual’s use of a wheeled device, biomechanical considerations, such as a review of postural stability are included in assessment (110). Therefore, as a starting point for assessment of mobility, observations of an individual’s postural stability may be useful in supporting an occupational therapists inferences regarding their safety in performing later items. Further, a lack of postural stability in a wheelchair can be improved through adaptation of the seating device, in order to support ongoing use of public transport and improved performance in later items. This suggests that SME 2 was able to differentiate between items that can be easily remediated through adaptation or assistive devices and items which require skill development of an individual. For example, an individual’s postural stability in a wheeled device may be improved through adjustments made to the components of the device and as a consequence the individual’s performance of functional mobility may improve (110). However, a different individual may present with stable postural stability, but still require assistance in order to perform the mobility tasks in the protocol, therefore in this instance the individual’s postural stability is of little relevance to the activity limitations which influence their ability to use public transport.

SME 3 determined that testing an individual’s orientation to “Home city” and “Year” was less relevant to public transport use than the items which test orientation to time and place. Orientation, a component of cognition, has not been situated in the CoMATI as a performance-based task. As a primary cognitive capacity, orientation is an important component of cognition to establish, as the absence of these primary capacities may indicate some degree of dysfunction. Dysfunction in orientation may influence executive functions, which is relevant in an individual’s ability to perform complex tasks such as public transport use (83,84,121). SME 1 commented that further clarity is required on what is being established by testing Home City, as home address precedes this item. The developers may need to consider differentiating between these items and clearly defining the purpose of testing both items.

Two of the five reading items were considered less relevant to public transport by SME 5. Further SME 1 commented that it was not clear whether literacy or visual abilities were being tested. SME 1 suggested that if literacy was the intended performance criterion, then the words should be printed in various font sizes. SME 5 suggested that it may be more relevant to observe an individual reading signs in a busy environment as this would be more relevant to public transport use. Similarly, SME 3 considered Image Two (Stop sign) to be less relevant than Image One (No

entry for pedestrians sign) and Image Three (Bicycles allowed sign). Conversely, SME 5 considered Image Three to be less relevant than the other two signs. SME 1 commented that again, clarity was required on whether performance should be scored on the basis of the individual's ability to name the sign or describe what actions should follow when encountering the sign.

Varying education levels and literacy skills may influence assessment of cognitive capacities (128,129). The developers of the CoMATI should consider providing clarity on the purpose of the Reading and Identifying signs sections. Mashiri et al (138) reported that the South Africans with cognitive impairments have reported limitations with their ability to identify the correct vehicles due to a lack of access to information in appropriate formats (138). The developers should consider include performance-based tasks which simulate reading demands encountered in public transport use as well as identification of vehicles.

The SME evaluation of certain items indicates that the content validity of the items may improve by making performance-based criteria and relevance to public transport use clearer. Certain items which are adaptable and easily supported by assistive devices may need to be highlighted to users of the CoMATI. For example, an inability to rest your chest on your thigh may be of benefit for picking up objects that have dropped to the floor, however an inability to pick up objects from the floor can be accommodated for when using an assistive device or assistance from the public. These items may support an occupational therapist's decision-making and treatment planning when framing an individual's activity limitations in public transport use. Further, the developers of the CoMATI may need to expand their activity analysis of public transport use. The descriptor of public transport use may need to be expanded to describe the environmental demands of urban streets and suburbs in order to support the inclusion of performance-based observations of certain community mobility demands such negotiating inclines and declines. Although these items are useful in the evaluation process, an individual's inability to perform them may not necessarily exclude the individual from continued use of public transport.

## 5.5 Items rated as Useful but not Essential and individual needs

A review of the items considered to have less relevance to the domain of public transport use by the SMEs and the corresponding literature, indicated that these items may be of less relevance regarding an individual's personal factors or may not be representative of the contextual factors which may influence performance.

The item "Email", under the Personal details section of the Interview Report Format, would enable e-mail correspondence with an individual. Whether or not an individual has an email address to provide is not of any relevance to their ability to use public transport. However, in the early stages

of gathering personal information, an occupational therapist may already be observing the individuals general functioning, seeking indicators of any impairments which may influence performance (7). Therefore, should an individual have an email address, their ability to remember, spell out, or sound out the address may be useful but not fully determinant of their abilities. When comparing the item “Email” to other items in the Personal details section such as “Age”, the item is comparably less relevant to the domain of public transport. In determining factors such as an individual’s age, the occupational therapist may be able to collect information on more personal factors that influence community mobility such as ageing; ageing has been shown to influence mobility (97).

The items “Activities of daily living” and “Leisure” are collected under the Occupational Function section of the Interview Report Format. In the CoMATI, occupational therapists are encouraged to collect information about an individual’s routine, preferences and experiences regarding the various domains of their occupational performance. ADL are considered to support an individual’s self-care and are differentiated from IADL which are considered to support community living (65). It is therefore fair, that SME 2 has considered that an individual’s performance of ADL is less relevant to their ability to perform an IADL such as public transport use. The CoMATI Interview Report Format was designed to support a top-down approach to assessment. The semi-structured format of the interview arranged evaluation of occupational function before Travel so that evaluation could begin with a subjective account of roles (157). The occupational therapist administering the interview could follow the format as a guideline and still have opportunities to expand on certain areas that become more relevant to the individual’s occupational performance. The majority of the SMEs considered interviewing an individual regarding their ADL performance as relevant. What is less understood is that SME 4 considered an individual’s performance in leisure activities and tasks as less relevant than work, education or community tasks. Exclusion of ADL and leisure would reduce the scope of occupational performance that is considered to be preferential by well validated interviews such as the COPM (88,89). Therefore, it is important that the items included are wholly relevant and representative to occupational performance and able to identify any difficulties in performing meaningful roles and environmental barriers and facilitators. SME 2 commented that the terms in the Occupational Function section are not clear. The relevance of each of these areas may become clearer to any occupational therapist using the CoMATI, if clear definitions are provided.

In the Assessment protocol for persons who use a wheeled device, a section for the evaluation of an individual’s performance of pressure relief is included. In the protocol the individual is required to perform one of three means of pressure relief considered to be adequate in the prevention of pressure sore development (112). SME 1 commented that performing only one of the three items



was not clear. SME 2 determined that evaluation of pressure relief was less relevant than other items contained in the protocol. According to the literature the importance of conducting routine pressure relief prevention is dependent on multiple personal factors which include but are not limited to an individual's medical condition, sensation, age and the presence of moisture and shear. SME 2's rating of pressure relief may reflect that evaluation of pressure relief performance is not relevant to all individuals when it does not form part of management of a medical condition or prevention of secondary complications.

In the Assessment protocol for person who use a wheeled device the item "Propel across a firm surface at a rapid pace and for a short distance. Bring the wheelchair to a stop as quickly as possible when instructed" in the Outdoor propulsion section as well as "Perform a wheelie to negotiate a curb" and "Propel forwards while balancing on the back wheels, across a loose surface" in the Advanced skills section were considered to be less relevant than other items in the protocol. The review of existing mobility courses indicated that occupational therapists reviewing similar tasks recommend that tasks which require a wheelie skill or negotiating curb should be removed. The researchers identified these skills as more difficult and as a result determined that they may not be relevant to certain individuals on the basis of users characteristics (116). Occupational therapists using the CoMATI may therefore need to select items they consider to be the most relevant to specific individuals.

The item "Telephone use" in the Communication section in the Interview Report Format as well as the two items which evaluate an individual's ability to use a cell phone in the Assessment protocol for persons with cognitive impairment were considered to have less relevance to public transport use by SME 5. SME 5 commented these items are not relevant to South Africans who do not own a cell phone or uses a cell phone to communicate when travelling. In reference to the literature review, the use of technology is a newly emerging element of IADL (134–137) and the use of smartphones is becoming an increasingly accessible means of communication in the South African context (158). Further the relevance of communication to PWD who use public transport has been demonstrated by Mashiri et al (138). Therefore, determining an individual's experience of communication in an interview, is relevant to individuals who own and use either a telephone or cell phone as a means of communication. As cell phone use is a rapidly growing, yet emerging activity in IADL, it is possible that SME 5 does not associate the task with community-based tasks but may differentiate an individual's means of communication to a separate domain of occupational performance. In this way function or dysfunction in cell phone use would not be considered as relevant to performance of public transport use, but rather a separate area of evaluation or problem analysis. Occupational therapists using the CoMATI may require

instructional guidance in the use of this item, as the cell phone use items should only be evaluated when they are considered to be contextually relevant to the individual requiring assessment.

The Environmental Awareness section was included in the Assessment protocol for persons who ambulate and the Assessment protocol for persons who use a wheeled device, as a screening of any cognitive, perceptual or visual impairments that were otherwise not reported in the Interview. The items contained in the Environmental Awareness section were considered to be Useful but not essential by SME 2 for both of the protocols in which the section is used as a screening. SME 2 has noted that the items may not be relevant to all individuals as the protocols selected are not primarily aimed at identifying these impairments. Despite this, the rating of SME 2 suggests that the items have some degree of relevance in certain instances and that the screen may prove useful.

The SME evaluation of individual items as set out in this paragraph, indicate that the content validity of the items may improve following revision of items to improve the clarity of such items. The use of a manual may provide occupational therapists with information on what each section is measuring and what criteria the individual's performance is based on. Further, occupational therapists using the CoMATI may require guidance in decision-making regarding when to consider administering certain items and when to leave the items or sections as *Not applicable*. For example, items which measure an individual's ability to select a contact on their cell phone, make a call or send a message would only be appropriate for those individuals who have reported in the interview, that they use a cell phone as a means of communication. Although these items are useful in the evaluation process, an occupational therapist may decide at various points of the evaluation process that these items are not relevant to the individual's needs or performance in the continued use of public transport.

## 5.6 Summary

This chapter demonstrates that the objectives of the study were achieved. As a result, there is evidence of content validity of the CoMATI. The results of the study determined that all items in the CoMATI have some degree of content validity. There was total agreement from SMEs regarding the relevance of certain items. For those items where full agreement on relevance was not achieved, the items were considered to be useful but not essential by one of the five SMEs. There were identifiable associations and patterns in the variance of SME ratings. SMEs with more years of clinical experiences tended to differentiate between the degrees of relevance of items more frequently than the SMEs with less years of clinical experience. However, SMEs with more years of experience did not agree on the degree of relevance for any given item, as may be expected.

A review of items that were considered to be less relevant indicated that these items may not be adequately performance based, may not have the same degree of influence in excluding an individual from public transport use, or may not be contextually relevant to some individuals. Therefore, in some instances, these items may not support representation of an individual's occupational performance, in a client-centred approach to evaluation. Occupational therapists using the present version of the CoMATI will need to rely on clinical reasoning to determine which of the available items are more relevant to creating a full representation of the actions and tasks required for an individual's performance of public transport use.

## Chapter 6: Conclusion

### 6.1 Introduction

Chapter Six will present the conclusions of the study as well as the strengths and limitations of to the study and recommendations for the future.

### 6.2 The content validity of the CoMATI in the context of the Cape Town metropole

The study indicates that all of the items contained in the CoMATI have some degree of content validity. Further considerations of items in the CoMATI determined that certain items may only be considered to be representative when they are considered to be contextually relevant to the individual being evaluated. Additionally, the relevance of certain items to public transport use was not explicitly clear when the items were more impairment focussed rather than performance-based. The utility of the CoMATI may be improved with the addition of a manual or training to support an occupational therapist's decision-making regarding relevance and representation when administering the CoMATI.

### 6.3 Strengths of the study

Evaluation and measurement of outcomes by occupational therapists concerned with PWD level of participation on an equal basis with others is supported and directed on a global and national level. The ability to use transportation enables participation in diverse occupations in urban environments. In a South African context, many citizens, including those with disabilities, rely on public transport to participate in community tasks. However, very few assessment tools that measure performance of community mobility tasks can be applied to practice settings in South Africa. The evidence of the CoMATI's content validity obtained in this study, supports the development of a reliable and valid assessment tool to measure the influence of impairments on the tasks required to use public transport use.

The results of this study are relevant to occupational therapists who are considering the use of the CoMATI. As outlined in the earlier chapters, the use of reliable and valid assessment and evaluation supports decision-making regarding treatment planning, and valid measurement of outcomes of treatment demonstrates the value of occupational therapist's services to PWD and affirms quality practice.

The study was enhanced by selecting occupational therapists with a significant number of years clinical experience who were additionally familiar with the experience of disability in the Cape Town context. As the content validity of the CoMATI was evaluated for its intended use in Cape

Town, the congruency between the items in the CoMATI and domain of public transport use were established based on the modes of public transport used within Cape Town. Some generalisability of the findings is anticipated, as similar modes of transport can be found elsewhere in South Africa, such as Johannesburg and Durban. However, modes such as MyCiti bus services are operated by the City of Cape Town only. Therefore, it is possible that certain items in the CoMATI may not carry representation or relevance to other contexts. Generalisability of the findings to smaller cities and towns as well as other countries is not considered to be as likely. The use of the CoMATI outside of Cape Town should therefore be approached with consideration of whether selection of the tool is appropriate.

The results and methodology of the study will be published in a peer review journal and may be of value to occupational therapists developing or researching similar assessment tools that are intended for use in the South African context. In concluding that certain items have varying degrees of relevance, and therefore validity, to community-based tasks such as public transport use, occupational therapists may be able to use the results of this study to enrich their own practice and decision-making.

#### 6.4 Limitations of the study

A possible limitation of this study was that none of the SMEs had specialised specifically in the domain of public transport use and the differences in their perspectives on disability and occupational performance were not explored. This study did not explore whether all SMEs were familiar with the ICF and were not all informed that the ICF was the framework for the CoMATI. Deeper enquiry into their frames of references may have provided additional insights into the SMEs decision-making processes and may have accounted for inconsistencies in their decision-making.

The operational definition of the public transport use provided to the SMEs was constructed by the developers of the CoMATI. The SMEs participating in the study used this operational definition to evaluate the items of relevance in the CoMATI. As the psychometric properties of the operational definition remain untested, the results of this content validity study may have to be revisited should the operational definition be altered. In a society where technology results in ongoing changes, aspects of the operational definition may change due to technological advances, changes in policy or changes in physical and structural environments in South Africa.

The Content Validity Rating Scale selected for the study consisted of a three-degree ordinal scale. This made analysis of the relevance of items difficult as some items had varying degrees of validity. Further, the data collection process did not consistently obtain rationales from SMEs regarding their ratings. As a result, interpretation of the varying degrees of relevance of items

relied on assumptions about the SMEs reasoning process supported by the literature review. Given the scope of the study, the researcher was limited in the amount of literature that could be presented. Given the wide scope of concepts that form the foundations of the CoMATI, it was not possible to explore each concept with a depth that may have enriched the discussion of the results of the study further. The study may have improved should the researcher have requested that SMEs indicate a reason when they rate any item as either *Useful but not essential* or *Not necessary*.

## 6.5 Recommendations

This section of the chapter will present recommendations for research, practice and education that emerged from the study results.

### 6.5.1 Recommendations on changes to CoMATI

The results of this study should be reviewed by the developers of the CoMATI. As the results of the study have determined that all items in the CoMATI have some degree of relevance to the domain of public transport use, the developers may retain all items in this and future versions of the CoMATI.

Conversely, the developers of the CoMATI may also exclude items which are not performance-based. Alternatively, the developers may review those items determined to have less relevance to performance of tasks related to public transport use. These items may need to be reviewed in order to make them more performance-based and thus improve their relevance to the domain of public transport use.

The developers may review those items that were indicated by the SMEs to support a broader representation of the domain of public transport use. The developers may conduct further research on the CoMATI in order to support their decisions regarding these and any other changes to the CoMATI.

### 6.5.2 Recommendations for occupational therapy practice

The results of this study will be published in order to raise awareness about the development and validity of the new measure that is appropriate for use in Cape Town. As discussed previously, evaluation of public transport use is valuable in the context of South Africa. The use of the CoMATI in occupational therapy practice in Cape Town and feedback and collaboration on the utility of the CoMATI between occupational therapists and the developers should be encouraged.

### 6.5.3 Recommendations for occupational therapy education

To the researcher's knowledge, the specific evaluation of public transport use is not included in undergraduate or post-graduate occupational therapy curricula. From this, one can infer that evaluation processes regarding public transport use are likely to be variable and informal. The results of this study and the development of the CoMATI may support the development of postgraduate courses on the domain of public transport as an area of specialised practice. The researcher recommends collaborations with tertiary institutions to determine to what extent and to what depth this domain should be included in undergraduate programmes.

The CoMATI manual may be developed further, in order to provide insight into the items that are included, the relevance of each item and guidance regarding the interpretation of performance of the items. In line with this recommendation, the results of the study have indicated that some items in the CoMATI are more relevant to certain individuals, depending on their contextual factors. The developers of the CoMATI may want to provide training in the use of the CoMATI, as well as the decision-making process regarding the selection of protocols and the determination of which items to include or exclude from evaluation. Considering that occupational therapists with less than five years of experience may require more guidance in decision-making, as well as reasoning, novice occupational therapists, as well as occupational therapists with minimal clinical experience may benefit from training on the use of the CoMATI.

### 6.5.4 Recommendations for future research

Further research should be conducted to explore the different perspectives and frameworks that occupational therapists apply to community mobility and public transport use in the contexts of Cape Town and South Africa. Further, as a tool such as the CoMATI is not available in South Africa, enquiry into the current evaluation processes for evaluation of community mobility and public transport use, should be conducted, as these findings may enrich the approach used in the CoMATI.

As evidence for the content validity of the CoMATI has been established, it is recommended that further evaluation of the CoMATI's psychometric properties follow. The CoMATI's criterion related validity should be explored. For example, the Interview Report Format may be independently validated against the COMP, which is considered to be a gold standard measure of occupational performance (89). Further evaluation of the CoMATI's psychometric properties may include determining the convergent and discriminant validity of the CoMATI. For example, it may be of interest to researchers to determine whether the Assessment protocol for persons who cognitive impairment is able to discriminate between degrees of cognitive impairment.

At present, the validity of the descriptor, or operational definition, of public transport use, which is included in the CoMATI is not known. Future research should include evaluation of the descriptor. As the administration of the CoMATI has shown to be influenced by contextual factors it is recommended that the ecological validity and generalizability of the CoMATI be evaluated. This type of research would provide further insights into how well the CoMATI predicts real-world functioning and is similar to the real-world conditions experienced by an individual. These findings may be of particular relevance to an occupational therapist interested in the validity of the CoMATI.

Assessment instruments that makes use of rating scales such as a CoMATI, use subjective categorical determinations to create ordinal measurements. These assessments may be subject to inter-rater reliability concerns. It is therefore recommended that further evaluation of the CoMATI be conducted to determine the internal consistency and reliability of the CoMATI.

### 6.5.5 Recommendations to the Department of Transport and Public Works

The South African government is currently providing specialised transport services to PWD in Cape Town and Durban, and the provision and management of the demand for these services is managed on an eligibility basis. The South African government may be interested in using and researching the utility of a tool such as the CoMATI for future eligibility determinations. Using a unified approach to assessment and eligibility determinations of PWD, using an assessment tool with evidence of content validity and perhaps soon additional evidence of validity and reliability, would support fair and substantiated determinations regarding service provision to PWD.



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# Appendices

## Appendix A: The CoMATI Interview Report Format

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### COMMUNITY MOBILITY ASSESSMENT TOOL FOR INDIVIDUALS (CoMATI) INTERVIEW

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#### 1. PERSONAL DETAILS

Name	
ID No. & Age	
Address	
Phone	
Email	
Accompanied by Phone	
Assessment date	

#### 2. DISABILITY INFORMATION

Diagnosis & onset	
Current treatment	
Presenting impairments	
Prognosis	<i>Permanent</i> <i>Temporary(Duration)</i> <i>Fluctuating</i> <i>Progressive</i>
Risk factors	

#### 3. OCCUPATIONAL FUNCTION

Support network	
Activities of daily living	
Community tasks	
Leisure	
Work/Education	

#### 4. TRAVEL

##### Access and need for transport

Private vehicle	<i>Availability. Frequency of use. Purpose. Experience.</i>
Sedan taxi	
Metro Rail	
Golden Arrow Bus	
MyCiti Bus	
Minibus taxi	
Organized transport	<i>E.g. Dial-a-Ride, HealthNet, institutional transport</i>

**5. SOCIAL & BEHAVIOURAL FUNCTION**

<b>Psychosocial experience</b>	
<b>Interaction with others</b>	
<b>Response to crowds</b>	

**6. COMMUNICATION**

<b>Speech</b>	
<b>Hearing</b>	
<b>Reading</b>	
<b>Non-verbal</b>	
<b>Telephone use</b>	
<b>Communication device</b>	

*Administer assessment protocol/s dependent on the client's impairment i.e. walking, wheeled device, cognitive or vision protocol.*

**7. COLLATERAL INFORMATION**

<b>Name</b>	
<b>Relationship</b>	
<b>Contact number</b>	
<b>Date contacted</b>	
<b>Information</b>	

**8. ASSESSMENT OUTCOME**

<b>Mobility device while traveling</b>	None White cane Service dog Prosthetic leg Calliper Walking stick Crutch Walking frame Rollator Folding manual wheelchair Rigid frame manual wheelchair Three wheeled manual wheelchair Motorized wheelchair Child buggy Scooter
<b>Public transport use</b> <ul style="list-style-type: none"> <li>• Ability to navigate route to and from public transport stop.</li> <li>• Ability to embark and disembark public transport.</li> <li>• Ability to travel on route.</li> </ul>	<b>Ordinal scale rating</b>
<b>Able to use public transport</b>	Yes/No



## Appendix B: The Assessment protocol for persons who ambulate


### COMMUNITY MOBILITY ASSESSMENT TOOL FOR INDIVIDUALS (CoMATI) WALKING PROTOCOL

Name:

Date:

Mobility aid used:

*The assessment is conducted with the client's preferred mobility aid when traveling.*

<b>1. ENVIRONMENTAL AWARENESS</b>	
Study the picture and answer the following questions.	
	
How many vehicles are on the road travelling towards you? <i>Answer: 4</i>	
Is the man crossing the road adhering to safe traffic rules? Why? <i>Answer: No. On cell phone. Not the right place to cross the road.</i>	
Where is the safest place to cross the road? <i>Answer: At the robots</i>	
<b>Comment:</b>	
<b>2. SITTING</b>	
Sit on a hard chair with a backrest but without armrests.	
Lean to the front, left and right. <i>Move just out of base of support.</i>	
Rotate trunk to the left and right. <i>Move just out of base of support.</i>	
Don't fall over while being nudged to the front, left and right.	
Lean forward, resting your chest on your thighs. Then sit up again.	
<b>Comment:</b>	

<b>3. TRANSITION MOVEMENTS</b>	
Stand up from sitting on the chair. <i>No more than 2 attempts.</i>	
Stay standing. <i>Immediate standing balance.</i>	
Sit down on the chair. <i>No more than 2 attempts.</i>	
<b>Comment:</b>	
<b>4. STANDING</b>	
Stand still.	
Lean to the front, left and right. <i>Move just out of base of support.</i>	
Rotate trunk to the left and right. <i>Move just out of base of support.</i>	
Don't fall over while being nudged to the front, left and right.	
Lean forward as far as you can go, bringing your head to your knees. Then straighten up again.	
<b>Comment:</b>	
<b>5. UPPER LIMB FUNCTION</b>	
Move your right arm to the front and take a wallet from the therapist at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	
Move your left arm to the front and take a wallet from the therapist at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	
Move your right arm to the side and grasp a broom stick at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	
Move your left arm to the side and grasp a broom stick at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	
Move your right arm to grab a broom stick above your head. <i>Minimum height: 2m above floor.</i>	
Move your left arm to grab a broom stick above your head. <i>Minimum height: 2m above floor.</i>	
With the right hand, squeeze the therapists hand as tight as you can until the therapist tells you to let go. <i>Minimum time: Hold grip for 15 seconds.</i>	
With the left hand, squeeze the therapists hand as tight as you can until the therapist tells you to let go. <i>Minimum time: Hold grip for 15 seconds.</i>	
Remove and replace cards, notes and coins from a wallet.	
<b>Comment:</b>	
<b>6. INDOOR WALKING</b>	
Walk at a preferred pace and method for a short distance, turn around and walk back.	
Walk at a rapid pace and a preferred method for a short distance, turn around and walk back.	
Walk at a preferred pace and method to the door, open the door, walk through the doorway with the therapist and close the door.	
<b>Comment:</b>	

<b>7. OUTDOOR WALKING</b>	
Walk across a loose surface at a preferred pace and method for a short distance, turn around and walk back. <i>E.g. grass, pebbles, sand.</i>	
Step up and down a cut curb.	
Step up and down a curb.	
Walk up an incline across a firm surface. <i>Minimum 1:12 gradient. Minimum length 2m</i>	
Walk down an incline across a firm surface. <i>Minimum 1:12 gradient. Minimum length 2m</i>	
<b>Comment:</b>	
<b>8. STEPS</b>	
Negotiate steps with the support of a handrail. <i>Minimum 3 steps, step height 20 – 25cm. Depth of step allows full foot on step and does not exceed height of step.</i>	
Negotiate these steps without the support of a handrail.	
Negotiate 1 high step with the support of a handrail. <i>Step height 30 – 35cm. Depth of step allows full foot on step and does not exceed height of step.</i>	
<b>Comment:</b>	
<b>9. CARRYING</b>	
While carrying a 5kg bag, using your preferred method: <i>Adjust the weight of the bag as relevant to the client's travel profile.</i>	
Walk across a firm surface at a preferred pace and method for a short distance.	
Walk across a firm surface at a rapid pace and a preferred method for a short distance	
Walk across a loose surface at a preferred pace and method for a short distance, turn around and walk back. <i>E.g. grass, pebbles, sand.</i>	
Step up and down a cut curb.	
Step up and down a curb.	
Walk up an incline across a firm surface. <i>Minimum 1:12 gradient.</i>	
Walk down an incline across a firm surface. <i>Minimum 1:12 gradient.</i>	
Negotiate steps with the support of a handrail. <i>Minimum 3 steps, step height 20 – 25cm.</i>	
Negotiate these steps without the support of a handrail.	
Negotiate 1 high step with the support of a handrail. <i>Step height 30 – 35cm.</i>	
<b>Comment:</b>	
<b>10. ENDURANCE</b>	
<i>Score the client's physical endurance during the assessment as relevant to their travel profile.</i>	
<b>Comment:</b>	

## Appendix C : The Assessment protocol for persons who use a wheeled device

### COMMUNITY MOBILITY ASSESSMENT TOOL FOR INDIVIDUALS (CoMATI) WHEELED DEVICE PROTOCOL

Name:


Date:

Wheeled device used:

Postural support items used:

Storage of wheeled device in vehicles:

*If clients are dependent on attendant propulsion, perform mobility course with the attendant.*

	Score
<b>1. ENVIRONMENTAL AWARENESS</b>	
Study the picture and answer the following questions:	
	
How many vehicles are on the road travelling towards you? <i>Answer: 4</i>	
Is the man crossing the road adhering to safe traffic rules? Why? <i>Answer: No. On cell phone. Not the right place to cross the road.</i>	
Where is the safest place to cross the road? <i>Answer: At the robots</i>	
<b>Comment:</b>	
<b>2. SITTING IN WHEELED DEVICE</b>	
Sit in wheeled device with backrest, with or without armrests.	
Lean to the front, left and right. <i>Move just out of base of support.</i>	

Rotate your trunk to the left and right, touching the backrest of the wheeled device with your hand.	
Don't fall over while being nudged to the front, left and right.	
Lean forward, resting your chest on your thighs. Then sit up again.	
<b>Comment:</b>	
<b>3. PRESSURE RELIEF</b> <i>Score either:</i>	
Lean forward, resting your elbows on your thighs for 2 minutes.	
Lean sideways resting your elbows on the seat of a chair placed next to the wheeled device for 2 minutes.	
Adjust the tilt in space position of your wheeled device for 2 minutes.	
<b>Comment:</b>	
<b>4. TRANSFERS</b> <i>Only perform transfers if it is safe to do so with the assistive devices and assistance available. If possible transfer on a slight gradient. Assess and score according to device used by client. Only provide instructions e.g. put on brakes, if the client forgets to perform this task.</i>	
Secure brakes.	
Set up wheeled device in preparation for transfer.	
Transfer from wheeled device onto a chair with a backrest but without armrests.	
<i>Administer: 5. Sitting on a chair and 6. Upper limb function.</i>	
Transfer back into wheeled device.	
Set up wheeled device in preparation for propulsion.	
<b>Comment:</b>	
<b>5. SITTING ON A CHAIR</b>	
Sit on a chair with a backrest but without armrests.	
Lean to the front, left and right. <i>Move just out of base of support.</i>	
Rotate trunk to the left and right. <i>Move just out of base of support.</i>	
Don't fall over while being nudged to the front, left and right.	
Lean forward, resting your chest on your thighs. Then sit up again.	
<b>Comment:</b>	
<b>6. UPPER LIMB FUNCTION</b> <i>Assess in a chair if the client is able to transfer. If they are unable to transfer assess in wheeled device.</i>	
Move your right arm to the front and take a wallet from the therapist at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	
Move your left arm to the front and take a wallet from the therapist at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	
Move your right arm to the side and grasp a broom stick at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	
Move your left arm to the side and grasp a broom stick at shoulder height. <i>Minimum range: Hand approximately 50 cm away from chest.</i>	

With the right hand, squeeze the therapists hand as tight as you can until the therapist tells you to let go. <i>Minimum time: Hold grip for 15 seconds.</i>	
With the left hand, squeeze the therapists hand as tight as you can until the therapist tells you to let go. <i>Minimum time: Hold grip for 15 seconds.</i>	
Remove and replace cards, notes and coins from a wallet.	
<b>Comment:</b>	
<b>7. INDOOR PROPULSION</b>	
Propel forward for 2-3 metres.	
Turn 360 degrees on the spot to the left and then the right.	
Propel backwards for 2-3 metres.	
Turn to the left and then right while moving forwards and backwards.	
Open a door. Propel through a hinged doorframe with the therapist. Close the door.	
<b>Comment:</b>	
<b>8. OUTDOOR PROPULSION</b>	
Propel across a firm surface at a preferred pace for a short distance, turn around and propel back. <i>E.g. paving, tar.</i>	
Propel across a firm surface at a rapid pace and for a short distance. Bring the wheelchair to a stop as quickly as possible when instructed.	
Propel across a loose surface at a preferred pace for a short distance, turn around and propel back. <i>E.g. grass, pebbles, sand.</i>	
Negotiate up and down a cut curb.	
Propel up an incline across a firm surface. <i>Minimum 1:12 gradient.</i>	
Propel down an incline across a firm surface. Bring the wheelchair to a stop at the bottom of the incline. <i>Minimum 1:12 gradient.</i>	
<b>Comment:</b>	
<b>9. ADVANCED SKILLS</b>	
<i>Assess advanced skills if appropriate and safe.</i>	
Perform a wheelie to negotiate a curb.	
Propel forwards while balancing on the back wheels, across a loose surface.	
<b>Comment:</b>	
<b>10. ENDURANCE</b>	
<i>Rate the client's physical endurance during the assessment as relevant to their travel profile.</i>	
<b>Comment:</b>	

## Appendix D: The Assessment protocol for persons with cognitive impairment

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### COMMUNITY MOBILITY ASSESSMENT TOOL FOR INDIVIDUALS (CoMATI) COGNITIVE PROTOCOL

---

Name:

Date:

	Score
<b>1. ORIENTATION</b>	
Provide the following information:	
Home address	
Home city	
Day	
Date	
Month	
Year	
Time (+/- 2 hours)	
<b>Comment:</b>	
<b>2. TIME</b>	
What is the exact time?	
You are attending a meeting at 3 o'clock. It takes you 30 minutes to get there. What is the latest time you can leave to be on time for the meeting? <i>Answer: 14h30</i>	
<b>Comment:</b>	
<b>3. CELL PHONE USE</b>	
Use a cell phone to access a contact list.	
Use a cell phone to make a call or send a text message.	
<b>Comment:</b>	

<p><b>4. MONEY MANAGEMENT</b> Provide the client with the wallet from the assessment kit.</p>	
<p>Identifying each note and coin. <i>Answer: R20 [1], R10 [1], R5 [3], R2 [2] &amp; R1 [1]</i></p>	
<p>Add the notes and coins together. <i>Answer: R50</i></p>	
<p>Subtract the value of the coins. <i>Answer: R30</i></p>	
<p>Calculate the following: You have R20. Your taxi fare is R14. How much change should you get? <i>Answer: R6</i></p>	
<p><b>Comment:</b></p>	
<p><b>5. IMMEDIATE RECALL OF VERBAL DIRECTIONS</b></p>	
<p>I will tell you the directions to go to a police station. You then have to repeat the directions. <i>Instructions can be repeated once.</i> You need to remember the directions because I will ask you to repeat them later in the assessment. <i>Delayed recall.</i></p> <p>To go to the <b>police station</b>, walk to the <b>second traffic light</b>. At the traffic light, <b>turn left</b>. Walk a <b>short distance</b> and you will see the police station.</p>	
<p><b>Comment:</b></p>	
<p><b>6. IDENTIFYING SIGNS</b></p>	
<p>Identify these images:</p> <div style="display: flex; justify-content: space-around; align-items: center;">    </div>	
<p><i>Answers: No pedestrians. Stop sign. Bicycle.</i></p>	
<p><b>Comment:</b></p>	



**7. ENVIRONMENTAL AWARENESS**

Study the picture below and answer the following questions:



How many vehicles are on the road travelling towards you? *Answer: 4*

Is the man crossing the road adhering to safe traffic rules? Why? *Answer: No. On cell phone. Not the right place to cross the road.*

Where is the safest place to cross the road? *Answer: At the robots*

**Comment:**

**8. IMMEDIATE RECALL OF VISUAL INFORMATION**

Now look at the same photo for a further 30 seconds. Focus on and remember the details in the photo. I will then take the photo away and ask you some questions about it.

Is it day or night time in the photo? *Answer: Day*

Which public transport vehicle is on the road? *Answer: Bus*

Is the man crossing the road wearing a jacket? *Answer: Yes*

**Comment:**

<b>9. PEDESTRIAN SAFETY</b>	
Name 3 safety precautions you take as a pedestrian. <i>Example answers:</i> <i>Walk on the side walk.</i> <i>Adhere to traffic signs.</i> <i>Don't cross the road when there are cars.</i> <i>Look left and right before crossing the road.</i> <i>Cross the road at a traffic light, when the walking man is green.</i> <i>Cross the road at a zebra crossing.</i>	
<b>Comment:</b>	
<b>10. DELAYED RECALL OF INFORMATION</b>	
Which public transport vehicle do you remember seeing in the photo? <i>Answer: Bus</i>	
Repeat the directions you heard earlier.  <i>Answer: To go to the <b>police station</b>, walk to the <b>second traffic light</b>. At the traffic light <b>turn left</b>. Walk a <b>short distance</b> and you will see the police station.</i>	
<b>Comment:</b>	
<b>11. READING</b>	
Read the following words: <b>CAPE TOWN</b> <b>STOP</b> <b>Post office</b> <b>Train Station</b> <b>Bus Stop</b>	
<b>Comment:</b>	

<p><b>12. EXECUTIVE FUNCTION</b></p> <p><i>Repeat information if client asks for information to be repeated.</i></p> <p><i>Ask them to explain why they chose an answer. Base the score on their reasoning.</i></p>	
<p><b>Step 1</b></p> <p>You have to attend a very important meeting in Cape Town in 1½ hours. You leave the house with R50 cash. You plan to travel by minibus taxi to the meeting. You arrive at the taxi rank and find out that there is a taxi strike and no minibus taxis are driving. You have 3 options. Which option can you afford and will get you to the meeting on time?</p> <p>A) You phone a friend to ask them if they can pick you up with their car to give you a lift. They are busy and will only be able to pick you up in 2 hours.</p> <p>B) You phone a private taxi service. They tell you that the trip will cost R75 and they only accept cash.</p> <p>C) You can see a bus stop down the road. The next bus, which will take you to your destination, will arrive at the bus stop in 10 minutes. Using the bus, it will take you 45 minutes to get to your meeting. The bus fare for the one way trip is R24.</p> <p><i>Answer: C. Based on time and/or cost.</i></p>	
<p><b>Step 2:</b></p> <p>It takes you 3 minutes to get to the bus stop. Which bus do you get on to?</p> <p>A) A bus arrives after 3 minutes. The bus is travelling to Mitchell's Plain.</p> <p>Two busses arrive after 7 minutes:</p> <p>B) The bus is travelling to Cape Town.</p> <p>C) The bus is travelling to Durbanville.</p> <p><i>Answer B. Travelling to correct destination.</i></p>	
<p><b>Step 3:</b></p> <p>Do you have enough money to pay for the bus fare for your return trip?</p> <p>A) Yes</p> <p>B) No</p> <p><i>Answer: A. Available money is sufficient for both trips. (R50 – R48=R2)</i></p>	
<p><b>Comment:</b></p>	

## Appendix E: The Assessment protocol for persons with visual impairment

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**COMMUNITY MOBILITY ASSESSMENT TOOL FOR INDIVIDUALS (CoMATI)  
VISION PROTOCOL**


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Name:

Date:

Visual aid used:

Mobility aid used:

Mobility and orientation training history:

	Score
<b>1. ASKING FOR ASSISTANCE</b>	
<i>Do this at the beginning of the assessment before rapport has been established.</i>	
How do you navigate an unfamiliar environment?	
What assistance do you require?	
<b>Comment:</b>	
<p><b>SCENARIO 1</b></p> <p><i>Before the interview: Orientate yourself to the assessment room. Provide input based on the level of assistance the client reports they need.</i></p> <p><i>After the interview repeat the above step. Ensure that they are orientated to the door, a bag placed in front of the door, table and chair.</i></p> <p>At the door there is a bag on the floor. Pick it up and walk towards the table. Sit down on the chair next to the table. On the table is a pricelist of the bus fares. How much is the bus fare to Woodstock? Retrieve the wallet from the bag. Open the wallet. Find R15 to pay for your ticket. Purchase s bus ticket. Make sure you get the right change.</p> <p><i>Begin the assessment 2m away from the door. Orientate the client to where they are in the room. Only provide assistance if requested.</i></p>	
<b>2. ORIENTATION TO A FAMILIAR ENVIRONMENT</b>	
Mobilise within the room.	
Locate a bag at floor level.	
Carry a bag while mobilising.	
Locate and sit down on a seat.	
Find the pricelist on the table.	
<b>Comment:</b>	
<b>3. READING</b>	
Read the pricelist. <i>Document the font size. Tell the client the price if they are unable to read.</i>	
<b>Comment:</b>	

<b>4. MONEY MANAGEMENT</b>	
Retrieve a wallet from the bag and money from the wallet.	
Identify notes.	
Identify coins.	
Calculate correct change.	
Return the money into the wallet and the wallet into the bag.	
<b>Comment:</b>	
<b>SCENARIO 2</b>	
Your bus will arrive at Woodstock Station in 30 minutes. Check what time it is now and tell me what time you will be arriving at Woodstock Station. Show me how you would phone a friend to let them know what time they should pick you up from the station.	
<b>5. TIME</b>	
Tell the time.	
<b>Comment:</b>	
<b>6. CELL PHONE USE</b>	
Use a cell phone to make a call.	
<b>Comment:</b>	
<b>7. ORIENTATION TO UNFAMILIAR ENVIRONMENT</b>	
<i>Create an outdoor route relevant to your setup. The route must include the following test items:</i>	
Identify obstacles at floor level.	
Identify obstacles above waist level.	
Navigate through a confined space.	
Maintain a safe path on a pavement.	
Identify surface changes.	
Negotiate steps.	
Negotiate a curb.	
Cross a road when it is safe to do so.	
<b>Comment:</b>	

## Appendix F: The CoMATI ordinal scale

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### COMMUNITY MOBILITY ASSESSMENT TOOL FOR INDIVIDUALS (CoMATI) ORDINAL SCALE

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- 5 - No assistance required.
- 4 - Requires an activity adaptation and/or assistive device/service animal.
  - Without assistance from a person.
- 3 - Requires assistance from a member of the public.
  - With or without assistive device/service animal.
  - Consider the individual's ability to ask for assistance, including speech, hearing confidence and behaviour.
- 2 - Requires assistance from a travel companion.
  - With or without assistive device/service animal.
- 1 - Requires assistance from more than 1 person.
  - With or without assistive device/service animal.
  - At least 1 person familiar with the client where the client has a communication or cognitive impairment.

#### **General considerations**

- Where possible every individual should be assessed without the use of an assistive device/service animal or assistance from a person in order to determine whether they can conduct the test item with no assistance required.
- Consider safety and the individual's circumstances when choosing a category.
- Where there is uncertainty between two categories, select the lower category.
- In instances where a test item cannot be objectively assessed, reliable interview information and clinical reasoning can be used to determine the score.

## Appendix G: The CoMATI descriptor of public transport use

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### COMMUNITY MOBILITY ASSESSMENT TOOLS FOR INDIVIDUALS (CoMATI) DESCRIPTOR FOR PUBLIC TRANSPORT USE

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The individual's ability to use public transport is divided into 3 steps.

1. Ability to navigate route to and from public transport stop.
2. Ability to embark and disembark public transport.
3. Ability to travel on route.

Based on the assessment findings the Occupational Therapist should be able to answer each of these 3 statements using the ordinal scale in order to determine the degree and type of assistance required for each step. This information should then be used to determine whether an individual's ability to use public transport is a realistic endeavor or whether they require further intervention or the use of specialized transport services that cater to their needs. The individual should be able to use at least **1** form of public transport for **each** of their desired trips.

The Occupational Therapist should apply their clinical reasoning to all of the individual's desired trips and consider the individual's functional ability to perform all steps required to use public transport for each of their desired trips. The Occupational Therapist should draw on objective assessment findings as well as the individual's subjective report of their routes. Where possible the Occupational Therapist should use Google Maps and local travel resources to verify information regarding distances and nearest stops when there is uncertainty.

When determining an individual's ability to use public transport the Occupational Therapist should consider:

- Whether the individual's level of impairment results in an unreasonable amount of assistance required from caregivers or members of the public.
- Whether psychosocial factors prevent the applicant from asking for assistance when using public transport.
- Whether the assistance required from a travel companion/s is consistently available for the desired trips.

#### **1. Ability to navigate route to and from public transport stop**

##### **Navigate from origin to public transport stop:**

- Starting point: Exit point of the building at origin.
- End point: Entry point of the vehicle, ready to embark the vehicle i.e.
  - MyCiti station platform or roadside stop
  - Metrorail station platform
  - Golden Arrow station platform or road side stop
  - Minibus station or roadside stop.

##### **Navigate from public transport stop to destination:**

- Starting point: Exit point of the vehicle, after vehicle has been disembarked i.e.
  - MyCiti station platform or roadside stop
  - Metrorail station platform

- Golden Arrow station platform or road side stop
- Minibus station or roadside stop.
- End point: Entry point of the building at destination.

#### **Changing vehicles on route:**

- Starting point: Exit point of the vehicle, after vehicle has been disembarked.
- End point: Entry point of the vehicle, ready to embark the vehicle.

#### **Consider the individual's ability to:**

- Negotiate along contextually relevant (rural/semi-rural/urban) terrain, crossing and navigating roads, pavements, cut away curbs, curbs and stairs.
- Mobilize using preferred method while carrying items or bags which are relevant to the desired route/s.
- Process environmental information regarding safety concerns.
- Identify relevant stations and appropriate roadside stops.
- Identify which vehicle to embark.
- Manage transport fares at the station or roadside, including handling bags and wallets and the exchange of notes, coins, bank cards and tickets with staff.
- Interact with members of the public and transport staff.
- Identify, problem solve and adapt to unexpected changes to the journey to implement an appropriate plan of action.

## **2. Ability to embark and disembark public transport**

#### **Embarking:**

- Starting point: Entry point of the vehicle, ready to embark the vehicle.
- End point: Travel position, either sitting on a vehicle seat, standing in a secure position or positioned in a wheelchair space.

#### **Disembarking:**

- Starting point: Start moving away from travel position.
- End point: Exit point of the vehicle, after vehicle has been disembarked.

#### **Consider the individual's ability to:**

- Transition through the doors of the stationary vehicle at a timeous pace, according to vehicle specifications below.
- Mobilize between the doors of the vehicle and an appropriate travel position relying on adequate balance
- Rely on right or left upper limb reach and grasp of surrounding seats or grab rails in order to deal with some degree of vehicle movement or instability when required.
- Identify a suitable travel position.

## **3. Ability to travel on route**

- Starting point: Assume travel position.
- End point: Start moving away from travel position.



**Consider the individual's ability to:**

- Remain in a travel position, either sitting on a vehicle seat, standing in a secure position or positioned in a wheelchair space with adequate postural support and balance while dealing with some degree of vehicle movement.
- Manage transport fares from a suitable travel position, in a moving vehicle, including handling bags and wallets and the exchange of notes, coins, bank cards and tickets with staff.
- Rely on right or left upper limb reach and grasp of surrounding seats or grab rails in order to deal with some degree of vehicle movement or instability when required.
- Identify disembarkation point.
- Manage personal medical needs.
- Maintain appropriate behaviour without creating distractions or hazards to the driver or passengers.
- Process environmental information regarding safety concerns.
- Identify, problem solve and adapt to unexpected changes to the journey to implement an appropriate plan of action.

**Vehicle specifications:****MyCity bus:**

- Variable height between platform and bus floor (+/- 15cm). Grabrails on the left and right on entry.
- Grabrails throughout the bus at variable heights either at or above shoulder level.
- No seat belts for vehicle seats.
- Extendable ramp for wheelchair. Wheelchair space with locking mechanism behind bus driver. Safety belt for wheelchair user. Wheelchair user faces towards the back of the bus. Bus driver able to assist wheelchair user. Sufficient floor space in the bus for a wheelchair, not secured with locking mechanism.

**Metrorail train:**

- Variable height between platform and train floor (+/- 30cm).
- At least 3m walking distance from door to suitable travel position.
- No grabrails available from platform. Availability of grabrails inside the entryway. Inconsistent availability of overhead grabrails within the carriageway.
- No seat belts.
- Sufficient floor space for a wheelchair on entry.

**Golden Arrow bus:**

- 6 steps (maximum height of 26cm) with a sharp curve and grabrails on the left and right on entry.
- Isle width 41cm, with overhead grabrails and points of contact along adjacent seats to the left and right.
- No seat belts.

**Golden Arrow adapted bus:**

- Central door with a flap and wheelchair accessible ramp. Ramp operated by bus driver.
- 1 demarcated wheelchair spot with wheelchair clamps behind the driver.
- Currently only operate during the day on Main Road between Retreat and Cape Town, with no specific timetable.

**Minibus taxi:**

- Back passenger seats accessed via a sliding door that is operated by the taxi guard.
  - 2 steps (maximum height of 33cm). Grabrail on left at shoulder height when entering.

- Isle width 31cm. No overhead rails and inconsistent points of contact along adjacent seats.
- Seat belts and grabrails inconsistently available from seating positions.
- Front passenger seat accessed via a standard vehicle door.
  - 2 steps. First step 45 cm from the ground. Second step 15cm from the first step.
  - Grabrail above shoulder level to the left of the passenger seat.
  - Seat belt available.

## Appendix H: Invitations to SMEs

Dear

I, Kirsti van der Vlugt, am a registered master's student with the division of Occupational Therapy at Stellenbosch University. I am conducting research on the newly developed Community Mobility Assessment Tool for Individuals (CoMATI). The CoMATI is an assessment tool designed to be used by occupational therapists and assesses an individual's ability to independently use public transport. The purpose of the research is to establish evidence for content validity of the CoMATI.

I am inviting you to join the study as a "subject matter expert". Your inclusion in the study is on the basis that you have experience and a background in research or clinical assessment/evaluation and/or measurement. There are no exclusion criteria.

Should you wish to participate, you will be asked to rate the items of the CoMATI in order to reflect the extent to which you think they are essential to the purpose of the assessment tool. Your ratings and any optional comments will be reflected on answer sheets which will be provided to you.

Participation in this study will only require between 1-2 hours. Further participation will not be required. Together we will arrange a place to meet or connect at a time and place that is suitable to your needs so that the answer sheets can be completed.

Prior to your completion of the answer sheet, you will be introduced to the content of the CoMATI and have an opportunity to ask questions. Your personal details will only be used for the purposes of our correspondence and appointment for the completion of the answer sheets. Your personal details will not be used for research purposes and will not be considered in the results or discussion of the research.

The ethical clearance number for this study is: 6411

Thank you for taking some time to consider your participation in this study. Please see the attached document for more information.

If you would like to know more about your potential involvement in this study or want to confirm your interest, please respond to this email address.

Regards

Kirsti van der Vlugt

## Appendix I: Consent form

# PARTICIPANT INFORMATION LEAFLET AND CONSENT FORM

### TITLE OF THE RESEARCH PROJECT:

The validity of the newly developed Community Mobility Assessment Tool for Individuals (CoMATI), conducted in the Cape Town Metropole

**REFERENCE NUMBER:** #6411

**PRINCIPAL INVESTIGATOR:** Kirsti van der Vlugt

**ADDRESS:** Faculty of Medicine and Health Sciences, Stellenbosch University, Francie van Zyl Drive, Parow.

**CONTACT NUMBER:** Copyright

You are being invited to take part in a research project. Please take some time to read the information presented here, which will explain the details of this project. Please ask the researcher any questions about any part of this project that you do not fully understand. It is very important that you are fully satisfied that you clearly understand what this research entails and how you would be involved. Also, your participation is **entirely your own decision** and you are free to say no if you do not wish to. If you say no, this will not affect you negatively in any way whatsoever. You are also free to say at any time if you do not want to be part of the study, even if you do agree to take part in the beginning.

This study has been approved by the Health Research Ethics Committee at Stellenbosch University and will be conducted according to the ethical guidelines and principles of the International Declaration of Helsinki, South African Guidelines for Good Clinical Practice and the Medical Research Council (MRC) Ethical Guidelines for Research.

What is this research study all about?

- The purpose of the research is to evaluate the content validity of the CoMATI during the continued process of development. The CoMATI is an assessment tool that has been designed for use by occupational therapists to assess an individual's ability to independently use public transport.
- You are invited to participate as one of at least five subject matter experts (SMEs) in this study.
- The focus of the research is to determine the extent to which all of the SMEs agree that each item included in the CoMATI is relevant and representative of the domain of independent public transport use.
- The data collected from this study will be used to review either the inclusion or exclusion of each item in the CoMATI.
- The study will contribute to gathering of evidence regarding the CoMATI's validity, ensuring that that CoMATI measures what it is intended to measure.
- The following steps will be followed:
  - The purpose of the study will be explained to you and your informed consent will be obtained before the start of the assessment. If you provide consent, I will ask you to sign this form.

- The researcher will familiarise each SME with the content and procedure of implementing the CoMATI. Each SME will be introduced to the report format and the protocols that are used to assess various impairments.
- You will be provided with an information sheet that outlines the criteria for determining an individual's ability to independently use public transport. You will be given answer sheets, each corresponding to the assessment procedures outlined in each of the protocols. You will be asked to rate how essential each procedural item is to determine an individual's ability to meet the criteria on the information sheet.
- The researcher will remain available to assist you with any queries; however, the researcher will not assist you with any decision making about how essential each item is.
- For research purposes, the completed answer sheets will be kept by the researcher in order to continue with the research process.
- I will not make your name know in the results or discussion sections of the study.

Why have you been invited to participate?

- The reason you have been invited to participate in this study is that you are a registered occupational therapist and have experience is assessment and/or measurement.

What will your responsibilities be?

- It is your responsibility to:
  - Provide informed consent to complete the answer sheets for the purpose of the study.
  - Ask questions should you not understand something.

Will you benefit from taking part in this research?

- You will receive payment for participating in the study, however, payment should not influence your opinions as the results of this study will inform the validity of the CoMATI assessment as well as best practise for this type of assessment tool development.
- Should the analyses indicate that the CoMATI demonstrates evidence for validity, then should you choose to implement this assessment in practice in the future, you have a degree of certainty that your findings and decisions on an individual's performance are accurate and fair.

Are there any risks involved in your taking part in this research?

- As your personal, identifying data is excluded from the research process, there is no risk for you to participate in the research.

If you do not agree to take part, what alternatives do you have?

- If you do not agree to participate in the research study, there will be no consequence, either professionally or personally if you do not wish to take part.
- Your expert judgements will then not be used for research purposes.

Who will have access to your answer sheets?

- Your personal, identifiable information will be removed from all the documentation submitted for data collection for this research study, ensuring your anonymity. The independent researcher will then have access to your anonymised answer sheet information.

Will you be paid to take part in this study and are there any costs involved?

- **You will be paid to take part in the study.** You will be compensated for your time and inconvenience and will be paid R40.00 (at a rate of R20.00 per hour) and I will provide refreshments in the form of tea/coffee and snacks for you to enjoy during the appointment.
- There will be no costs involved for you, if you do take part.

Is there anything else that you should know or do?

- You can contact Kirsti van der Vlugt at **Copyright** if you have any further queries or encounter any problems.
- You can contact the Health Research Ethics Committee at 021-938 9207 if you have any concerns or complaints that have not been adequately addressed by your study therapist.
- You will receive a copy of this information and consent form for your own records.

### **Declaration by participant**

By signing below, I ..... agree to take part in a research study entitled The validity of the Community Mobility Assessment Tool for Individuals (CoMATI), conducted in the Cape Town Metropole.

I declare that:

- I have read the consent form and it is written in a language with which I am fluent and comfortable.
- I have had a chance to ask questions and all my questions have been adequately answered.
- I understand that taking part in this study is voluntary and I have not been pressurised to take part.
- I may choose to leave the study at any time and will not be penalised or prejudiced in any way.
- I may be asked to leave the study before it has finished, if the researcher feels it is in my best interests, or if I do not follow the study plan, as agreed to.

Signed at (*place*) ..... on (*date*) ..... 2018.

.....  
**Signature of participant**

.....  
**Signature of witness**

Declaration by investigator

I (*name*) ..... declare that:

- I explained the information in this document to .....
- I encouraged him/her to ask questions and took adequate time to answer them.

- I am satisfied that he/she adequately understands all aspects of the research, as discussed above.
- I did/did not use an interpreter. (*If an interpreter is used then the interpreter must sign the declaration below.*)

Signed at (*place*) ..... on (*date*) ..... 2018.

.....  
**Signature of investigator**

.....  
**Signature of witness**

### **Declaration by interpreter**

I (*name*) ..... declare that:

- I assisted the investigator (*name*) ..... to explain the information in this document to (*name of participant*) ..... using the language medium of Afrikaans/Xhosa.
- We encouraged him/her to ask questions and took adequate time to answer them.
- I conveyed a factually correct version of what was related to me.
- I am satisfied that the participant fully understands the content of this informed consent document and has had all his/her question satisfactorily answered.

Signed at (*place*) ..... on (*date*) .....

.....  
**Signature of interpreter**

.....  
**Signature of witness**

## Appendix J: The Content Validity Rating Scale (example)

**Answer Sheet Five: Assessment protocol for persons with visual impairment.**

This protocol is used to assess an individual who has a reported visual impairment or medical condition or disability that is associated with a visual impairment that may impact on their ability to independently use public transport.

The visual aid and/or mobility aid used as well as the individual's mobility and orientation training history is documented. The individual may use their preferred or prescribed visual assistive device/s or methods during assessment.

Please rate each item according to how essential the item is in assessing an individual's ability to independently use public transport.

	Essential	Useful but not essential	Not essential
<b>Asking for assistance</b> <i>Do this at the beginning of the assessment before rapport has been established.</i>			
1.How do you navigate an unfamiliar environment?			
2.What assistance do you require?			
<p><b>Scenario 1:</b> <i>Direction to client before the interview:</i> Orientate yourself to the assessment room. Provide input based on the level of assistance the client reports they need. After the interview repeat the above step. Ensure that they are orientated to the door, a bag placed in front of the door, table and chair. Begin the assessment 2m away from the door. Orientate the client to where they are in the room. Only provide assistance if requested.</p> <p>At the door there is a bag on the floor. Pick it up and walk towards the table. Sit down on the chair next to the table. On the table is a pricelist of the bus fares. How much is the bus fare to Woodstock? Retrieve the wallet from the bag. Open the wallet. Find R15 to pay for your ticket. Purchase s bus ticket. Make sure you get the right change.</p>			
<b>Orientation to familiar environment.</b>			
3. Mobilise within the room.			



4. Locate a bag at floor level.			
5. Carry a bag while mobilizing.			
6. Locate and sit down on a seat.			
7. Find the pricelist on the table.			
<b>Comment:</b>			
<b>Reading</b>			
8. Read the pricelist. <i>Document the font size. Tell the client the price if they are unable to read.</i>			
<b>Comment:</b>			
<b>Money management</b>			
9. Retrieve a wallet from the bag and money from the wallet.			
10. Identify notes.			
11. Identify coins.			
12. Calculate correct change.			
13. Return the money into the wallet and the wallet into the bag.			
<b>Comment:</b>			

<b>Scenario 2:</b> Your bus will arrive at Woodstock Station in 30 minutes. Check what time it is now and tell me what time you will be arriving at Woodstock Station. Show me how you would phone a friend to let them know what time they should pick you up from the station.			
<b>Time</b>			
14. Tell the time.			
<b>Comment:</b>			
<b>Cell phone use</b>			
15. Use a cellphone to make a call.			
<b>Comment:</b>			
<b>Orientation to unfamiliar environment</b> <i>Create an outdoor route relevant to your setup. The route must include the following test items:</i>			
16. Identify obstacles at floor level.			
17. Identify obstacles above waist level.			

18. Navigate through confined space.			
19. Maintain a safe path on a pavement.			
20. Identify surface changes.			
21. Negotiate steps.			
22. Negotiate a curb.			
23. Cross a road when it is safe to do so.			
<b>Comment:</b>			