SOUTH AFRICAN CONSUMER KNOWLEDGE, ATTITUDE AND PERCEPTION/PRACTICE (KAP) OF *CANNABIS* AND *CANNABIS*-INFUSED SNACK FOODS

by

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DEDICATION

I would like to dedicate this dissertation to our late Oupa Japie Krüger who sadly passed last year in October. Thank you for always showing so much interest in my study, your kindness and your profound belief in my work and abilities. You will be dearly missed.

DECLARATION

I, Marlize Krüger, hereby declare that the dissertation, (*South African consumer knowledge, attitude and perception/practice (KAP) of Cannabis and Cannabis-infused snack foods*) which I hereby submit for the degree of Master of Consumer Science at the University of South Africa, is my own work and has not previously been submitted by me for a degree at this or any other institution.

I declare that the dissertation does not contain any written work presented by other persons whether written, pictures, graphs or data or any other information without acknowledging the source.

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I declare that during my study I adhered to the Research Ethics Policy of the University of South Africa, received ethics approval for the duration of my study prior to the commencement of data gathering, and have not acted outside the approval conditions. I declare that the content of my dissertation/thesis has been submitted through an electronic plagiarism detection program before the final submission for examination.

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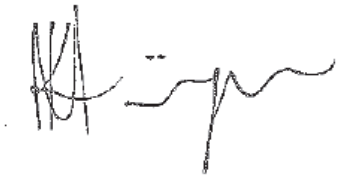

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ABSTRACT

Following numerous other countries that have relaxed their stringent *Cannabis* laws, *Cannabis* has recently been decriminalised in South Africa. This has led consumers to believe that *Cannabis* is more acceptable and so increasing the demand for *Cannabis* and *Cannabis*-infused products available on the market. However, international studies conducted in terms of consumer knowledge-attitude-perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snacks have revealed that consumers have knowledge gaps which may affect their attitudes and perception/practice surrounding *Cannabis*. In addition, using *Cannabis* irresponsibly may also place consumers and manufacturers at risk. This merits the exploration of South African knowledge-attitude-perception/practice of *Cannabis* and *Cannabis*-infused snacks.

A qualitative research paradigm, explorative up until saturation in nature was adopted to explore the views of 36 participants that had heard of *Cannabis* or any of its synonyms. Participants were recruited via non-probability sampling techniques such as convenience sampling, referral sampling and purposive sampling from some of the provinces in South Africa. Of these interviews, 25 were individual interviews and supplemented with two focus groups. One focus group consisted of participants that had consumed *Cannabis*, whilst the other focus group consisted of participants that had not. During the data-gathering period, the COVID-19 pandemic was being controlled through social distancing and all interviews were, therefore, conducted on Microsoft Teams©. This enabled the researcher to record the proceedings and transcribe the data to be analysed through content analysis. The categories that emerged were then tabulated and represented through figures in accordance with the study objectives. The research was based on the principles of trustworthiness and executed accordingly with ethical clearance granted before commencing with the study.

The findings obtained from this study suggested that all participants possessed a degree of subjective knowledge regarding *Cannabis*. Medicinal applications were the most common benefit in contrast to recreational uses and its side effects as the most common risks associated with *Cannabis*. Participant objective knowledge regarding *Cannabis* was, however limited with *Cannabis* users more likely to possess better objective knowledge regarding Cannabidiol (CBD) and Δ^9-Tetrahydrocannabinol (THC) as chemicals in *Cannabis*. Alternatively, the majority of participants possessed acceptable objective knowledge regarding the recent *Cannabis* legislation in South Africa, suggesting that news articles may be effective in creating consumer awareness. Consumer attitudes toward *Cannabis* varied greatly but was associated with the intended use of *Cannabis*. Health and remedial applications were more accepted as opposed to recreational applications. These motives were also often linked to older age (35+ years) and non-*Cannabis* use. Alternatively, more participants were in favour of the recent *Cannabis* legislation with almost half of participant supportive of the ruling. However, the majority of participants, whether in favour or opposed to the legislation, felt that legislative improvements were required.

Furthermore, the findings from this study indicated that more than two thirds of participants had used *Cannabis* at least once. Participants that had not used *Cannabis* cited individual-specific concerns of side effects and lack of accessibility as motives for not consuming *Cannabis*. Participants that had used *Cannabis* were divided as to experimental (used *Cannabis* three times or less) and experienced *Cannabis* users (used *Cannabis* four or more times). Experienced *Cannabis* users were further split into past user, use as require, occasional user and frequent user. The top three motives for consuming *Cannabis* were curiosity, therapeutic applications, and recreational reasons. Only a few participants used some sort of method to dose the quantity of *Cannabis* consumed, with the majority of experimental and occasional users having no dosing method. Dosing method was later provided as one of the reasons for participant-specific experiences from *Cannabis* use with no dosing method related to not meeting

participant expectations. Finally, the majority of participants were not willing to consume a snack infused with *Cannabis* unconditionally and irregular side effects and sensory properties were amongst the reasons for not being willing to consume an edible. Finally, the majority of participants required the snack to be regulated and verified before being willing to consume it.

This study provided a basis towards understanding consumer knowledge of, their attitude toward and perception/practice of *Cannabis* and *Cannabis*-infused snack foods. Future research should focus on including a larger sample of the South African population to gain an in-depth understanding of consumer KAP regarding *Cannabis* and *Cannabis*-infused snacks. Secondly, since older age was associated with having more unfavourable KAP toward *Cannabis*, future research could focus on older generations and how they obtain their information. Some recommendations from the study involved the development of regulated and verified *Cannabis* and *Cannabis*-infused snacks as inexperienced usage combined with an unregulated product may put consumers at risk. Next, marketers should consider creating consumer awareness as to the phytochemicals present in *Cannabis* as well as possible benefits and side effects concerning *Cannabis*, specifically cannabidiol (CBD). Marketers could, furthermore, direct their marketing strategies on the benefits of *Cannabis* toward older generations and promote responsible use amongst younger generations. Finally, the environmental and economic potential of *Cannabis* should also not be disregarded, especially since consumers are more aware and concerned for the environment.

KEYTERMS

Cannabis Sativa; Hemp; Cannabidiol (CBD); Δ^9-Tetrahydrocannabinol (THC); consumer behaviour; knowledge; attitudes; perception/practice; KAP.

USHWANKATHELO

Kutshanje, ilizwe lase Mzantsi Afrika liye lalandela amanye amazwe athe axegisa imithetho engqongqo ye-*Cannabis* ebizwa intsangu ngolwimi. Lonto iye yabangela ukuba abathengi baseMzantsi Afrika bayamkele i-*Cannabis* nezimuncumuncu ezifakwe i-*Cannabis*, ntoleyo ebangele ukonyuka kwezinga lokulangazelelwa kweemveliso zayo kumaqonga okuthengisa. Nangona kunjalo, uphando-nzulu oluqhutywe kumazwe ngamazwe malunga nolwazi lwabathengi-isimo-isenzo/ukuqonda (i-KAP) ye-*Cannabis* nezimuncumuncu ezifakwe i-*Cannabis* luye lwaveza ukuba kukho umsantsa wolwazi onokuchaphazela izimo zabo zengqondo kunye nokusebenza/umbono ojikeleze i-*Cannabis*. Ngaphezulu, ukusetyenziswa kwe-*Cannabis* ngendlela engenankathalo kunokubeka abathengi/ abasebenzisi nabavelisi be-*Cannabis* emngciphekweni. Lonto ikhuthaza ukuba kuphononongwe ulwazi lwabathengi boMzantsi Afrika-indlela yokusebenzisa/ukubona kwabo i-*Cannabis* nezimuncumuncu ezifakwe i-*Cannabis*.

Koluphando-nzulu, kusetyenziswe uhloblo lokuphonononga olubizwa nge “qualitative research paradigm” ukuqokelela izimvo okanye iimbono zabathathi-nxaxheba abangamashumi amathathu nesithandathu (36) ababekhe beva ngegama le-*Cannabis* okanye naziphi na izithetha-ntonye zayo. Abathathi-nxaxheba baye baqokelelwa kumaphondo athile ase Mzantsi Africa ngokusetyenziswa kweendlela ezibizwa “non-probability sampling techniques”, ezindlela zaziwa ngokuba zi “convenience sampling, referral sampling kunye ne purposive sampling”. Udliwano-ndlebe olungamashumi amabini anesihlanu luye lwabandakanya abathathi-nxaxheba abazimeleyo lwaze longezwa okanye lwancediswa ngamaqela amabini ekugxilwe kuwo abizwa ngokuthi “focus groups”. Elinye lalamaqela libandakanya abathathi-nxaxheba abakhe bayisebenzisa i-*Cannabis* ngelixesha elinye iqela belinabathathi-nxaxheba abangazane bayisebenzisa i-*Cannabis*. Ngexesha lokuqokelelwa kweengcombolo, ukusasazeka kwesifo esikhoyo elizweni jikelele esibizwa nge “COVID-19 pandemic” kwaye kwavikelwa ngokuqaqelelanisa abathathi-nxaxheba kulo lonke udliwano-ndlebe ngokuthi kusetyenziswe iqonga elibizwa nge “Microsoft Teams©”. Lonto yenza ukuba umphandi akwazi ukutshicilela inkqubo nokuqokelela iingcombolo ukuze kuhlalutywe iinkcukacha zazo. Iindidi ezathi zavela koluhlaziyo zaye zadweliswa zabe seziboniswa kusetyenziswa izibonisi-mifanekiso ezilungelelwaniswe neenjongo zophando. Oluphando lwalusekelwe kwimigaqo ethembekileyo yaye lwenziwa ngokulandela nokuthobela imiqathango yokuziphatha nokuhlonipha ekwilungelo nemvume yokuqalisa uphando.

Iziphumo zoluphando zibonakalisa ukuba bonke abathathi-nxaxheba banolwazi oluphantsi malunga ne-*Cannabis*. Olona lwazi oluhamba phambili lolokunceda kwe- *Cannabis* xa isetyenziswa njengechiza xa kuthelekiswa nolonwabo kunye nemiphumela engamkelekanga edla ngokweyanyaniswa nokusetyenziswa kwe- *Cannabis*. Ukubanolwazi oluphantsi kwabathathi-nxaxheba malunga ne-*Cannabis* kwakubonakala kungcono kubasebenzisi be- *Cannabis*, lonto ibonakalisa ukuba abasebenzisi be- *Cannabis* banganolwazi olungcono ngechiza elifumaneka kwincindi ye- *Cannabis* elibizwa nge “Cannabidiol (CBD) and Δ9-Tetrahydrocannabinol (THC)”. Okanye, uninzi lwabathathi-nxaxheba babenolwazi oluphantsi malunga nemithetho yaseMzantsi Afrika elawula ukutyalwa/kuphathwa nokusetyenziswa kwe- *Cannabis*, ntoleyo ebonisa ukuba ukubhalwa kupapashwe amanqaku amatsha ngemithetho nolawulo lwe- *Cannabis* kungabayeyona ndlela engcono yokwaziza ngalemithetho. Isimo sabathathi-nxaxheba sokuqonda esoyanyaniswa ne- *Cannabis* sabonakalisa ukohluka kakhulu kodwa soyamene nokusetyenziswa kwe- *Cannabis*. Ukusetyenzwa kwe- *Cannabis* ukunyanga nokuthibaza izigulo kwabonakala kwamkeleke ngaphezu kokusetyenziswa kwayo kwezolonwabo. Ezizimvo ke zoyanyaniswa nabathathi-nxaxheba ababudala obungaphezu kweminyaka engamashumi amathathu anesihlanu kunye nabo bangayisebenzisiyo i-*Cannabis*. Kungenjalo, uninzi lwabathathi-nxaxheba babevumelana futhi besamkela utshintso olutsha kwimithetho elawula ukutyalwa/ukuphathwa

nokusetyenziswa kwe- *Cannabis*. Nangona kunjalo, uninzi lwabathathi-nxaxheba bevumelana okanye bengavumelani notshintsho lomthetho we- *Cannabis*, bonke babona kukho isidingo sohlaziyo lomthetho ebhekene neendaba ze- *Cannabis*.

Kanajalo, iziphumo zoluphando ziye zabonakalisa ukuthi ngaphezu kwesibini kwisithathu sabathathi-nxaxheba sake sayisebenzisa i-*Cannabis* kanye ebuncinaneni. Abathathi-nxaxheba abangekaze bayisebenzise i-*Cannabis* baye babala izizathu zabo umntu ngamnye, ezifana nemiphumela engamkelekanga nokungafumaneki kunye nenjongo yokusetyenzwa kwayo. Abathathi-nxaxheba abake bayisebenzinsa bohlukaniswa babangabafunda ukusetyenziswa kwayo (bayisebenzisa kathathu okanye ngaphantsi koko) kunye nabanamava okuyisebenzisa (bayisebenzisa kane okanye ngaphezu koko). Abasebenzisi abanamava baye bohlukaniswa bangabake bayiseenzisa kwixesha elodlulayo, abayisebenzisa xa beyinqanqathekele, abahlala-hlale bayisebenzise, kunye nabayisebenzisa rhoqo. Ezona njongo eziphambili zokuysebenzisa ezintathu kwaba ngumdla, ukunyanya okanye ukuthobaza ukugula, nokuyisebenzisela ulonwabo. Babambalwa abathathi-nxaxheba abakhe basebenzisa ndlela-thize yokukala umlinganiselo we- *Cannabis* phambi kokuba bayisebenzise ngelixa uninzi lwafunda ukusebenzisa i-*Cannabis* nabahlala-hlale bayisebenzise bengekaze basebenzise kwandlela yokukala umlinganiselo abozowusebenzisa. Ukalo lomlinganiselo lwaye loyanyaniswa nezizathu abathathi-nxaxheba baye bazive ngeendlela ezohlukeneyo kwabangakali mlinganiselo xa bephantsi kwempembelelo ye- *Cannabis*, abangakali mlingaliselo bagqibela bengazivanga ngendlela ebebelindele ukuziva ngayo xa bephantsi kwempembelelo. Okokugqibela, uninzi lwabathathi-nxaxheba wawungenamdla wokungcamula izimuncumuncu ezifakwe i-*Cannabis* naphantsi kweyiphi imeko, izizathu zoko zibandakanya imiphumela engamkelekanga nokuchaphazeleka kweempawu ezinje ngencasa nevumba njalo-njalo, ngelixa uninzi lwabonisa ukuba lungazingcamla kuphel xa kungabanomthetho olawula oluhlobo lwezimuncumuncu futhi kuqinisekiswe ukulungela kwazo ukutyiwa ngabantu.

Oluphando lusinika isiseko solwazi malunga nolwazi lokuba abahlali/bathengi babona beqonda njani ukusetyenziswa kwe- *Cannabis* ekwenzeni izimuncumuncu. Ezinye zeengcebiso koluphando zibandakanya ukuqulunqwa kwendlela engcono yokuthengisa umbono woluhlobo lwezimuncumuncu, kunye nokunxibelelana nabo banokuzisebenzisa, ukwenziwa kwezimuncumuncu ezihloliweyo ukulungela kwazo ukutyiwa ngabantu kunye neminye imiba eyoyamene noko engathi iqwalaselwe kwixesha elizayo xa kusenziwa uphando. Futhi, oluphando lulinyathelo lokuqala lokuqonda ulwazi-isimo sengqondo-ukwenza/ukuqonda “KAP” kubahlali/bathengi baseMzantsi Afrika malunga nentsngu kunye nezimuncumuncu ezine- *Cannabis* futhi sisisiseko sophando kwixesha elizayo kulenkalo yobungcali.

AMAGAMA APHAMBILI

Cannabis Sativa; Hemp; Cannabidiol (CBD); Δ9-Tetrahydrocannabinol (THC); ukuziphatha kwabathengi ; ulwazi; isimo sengqondo; ukuziqhelanisa/ukuqonda ; KAP.

ABSTRAK

Na aanleiding van talle ander lande wat hul streng *Cannabis*-wette verslap het, is *Cannabis* onlangs in Suid-Afrika gedekriminaliseer. Dit het verbruikers laat glo dat *Cannabis* en die verbruik daarvan meer aanvaarbaar is en gevolglik die vraag verhoog na *Cannabis* en *Cannabis*-geïnfuseerde produkte. Internasionale studies wat in terme van verbruikerskennis-houding-praktyk/persepsie (KHP) van *Cannabis* en *Cannabis* gedoen is, het egter aan die lig gebring dat verbruikers kennisgapings het wat hul houdings en praktyk/persepsie rondom *Cannabis* kan beïnvloed. Daarbenewens kan die onverantwoordelike gebruik van *Cannabis* ook verbruikers en vervaardigers in gevaar stel. Dit verdien die verkenning van Suid-Afrikaanse kennis-houding-praktyk/persepsie (KHP) van *Cannabis* en *Cannabis*-geïnfuseerde versnapperinge.

'n Kwalitatiewe navorsingsparadigma, ondersoekend tot versadiging van aard, is aangeneem om die sienings van 36 deelnemers wat van *Cannabis* of enige van sy sinonieme bewus was, te ondersoek. Deelnemers is deur middel van nie-waarskynlikheidsteekproeftegnieke soos geriefsteekproefneming, verwysingsteekproefneming en doelgerigtesteekproefneming van sommige van die provinsies in Suid-Afrika gewerf. Van hierdie onderhoude was 25 individuele onderhoude, aangevul met twee fokusgroepe. Een fokusgroep het bestaan uit deelnemers wat voorheen *Cannabis* verbruik het, terwyl die ander fokusgroep uit deelnemers bestaan het wat nie voorheen *Cannabis* verbruik het nie. Gedurende die data-insamelingstydperk was die COVID-19-pandemie deur sosiale distansiëring beheer en alle onderhoude is dus op Microsoft Teams© gevoer. Dit het die navorser in staat gestel om die verrigtinge op te neem en die data te transkribeer en deur middel van inhoudsanalise te ontleed. Die kategorieë wat na vore gekom het, is dan in tabelvorm sowel as deur figure voorgestel in ooreenstemming met die studiedoelwitte. Die navorsing is gebaseer op die beginsels van betroubaarheid en dienooreenkomstig uitgevoer met etiese klaring wat verkry is voordat daar met die studie begin is.

Die bevindinge wat uit hierdie studie na vore gekom het, het voorgestel dat alle deelnemers 'n mate van subjektiewe kennis oor *Cannabis* besit. Medisinale toepassings was die mees algemene voordeel terwyl ontspanningsgebruike en die newe-effekte die mees algemene risiko's was wat met *Cannabis* geassosieër word. Deelnemers se objektiewe kennis rakende *Cannabis* was egter beperk en *Cannabis*-gebruikers was geneig om oor beter objektiewe kennis te beskik rakende Cannabidiol (CBD) en Δ9-Tetrahydrocannabinol (THC) as chemikalieë in *Cannabis*. Alternatiewelik het die meerderheid deelnemers aanvaarbare objektiewe kennis getoon rakende die onlangse *Cannabis*-wetgewing in Suid-Afrika, wat daarop dui dat nuusartikels effektief kan wees om bewustheid onder verbruikers te skep.

Verbruikershoudings teenoor *Cannabis* en versnapperings wat met *Cannabis* aangevul is, het grootliks verskil, maar is geassossieer met die beoogde gebruik van *Cannabis*. Gesondheids- en remediërende toepassings was beter aanvaar as ontspanningsaansoeke. Hierdie motiewe was ook dikwels gekoppel aan ‘n ouer ouderdom (35+ jaar) en nie-*Cannabis*-gebruikers. Alternatiewelik was meer deelnemers ten gunste van die onlangse *Cannabis*-wetgewing met byna die helfte van die deelnemers wat die beslissing ondersteun het. Die meerderheid deelnemers, hetsy ten gunste van of gekant teen die wetgewing, het egter gevoel dat wetgewende verbeterings nodig was.

Verder het die bevindinge van hierdie studie aangedui dat meer as twee derdes van die deelnemers *Cannabis* ten minste een keer gebruik het. Deelnemers wat nie *Cannabis* gebruik het nie, het individueel-spesifieke, bekommernisse oor moontlike newe-effekte en 'n gebrek aan toeganklikheid aangehaal as motiewe. Deelnemers wat *Cannabis* gebruik het, is gegroepeer in eksperimentele (het *Cannabis* drie keer of minder gebruik) en ervare *Cannabis*-gebruikers (het *Cannabis* vier of meer keer gebruik). Ervare *Cannabis*-gebruikers is verder verdeel in vorige gebruiker, gebruik soos vereis, af-en-toe gebruiker en gereelde gebruiker. Die top drie motiewe vir die verbruik van *Cannabis* was

nuuskierigheid, terapeutiese toepassings en ontspanningsredes. Slegs 'n paar deelnemers het 'n metode gebruik om die hoeveelheid *Cannabis* wat verbruik is te doseer, met die meerderheid eksperimentele en af-en-toe gebruikers wat geen doseermetode gehad het nie. Doseringsmetodes is later verskaf as een van die redes vir deelnemer-spesifieke ervarings van *Cannabis*-gebruik en geen doseringsmetode het verband gehou met ervarings wat nie voldoen het aan deelnemers se verwagtinge nie. Laastens was die meerderheid deelnemers nie bereid om 'n versnappering wat met *Cannabis* aangevul is onvoorwaardelik te eet nie en onreëlmatige newe-effekte en sensoriese eienskappe was van die redes waarom hulle nie bereid was om 'n *Cannabis*-versnappering te eet nie. Die meerderheid deelnemers het egter vereis dat die peuselhappie gereguleer en geverifiëer moet word voor hul bereid was om die versnappering te verbruik.

Hierdie studie verskaf ‘n basis om verbruikerskennis, -houdings en -praktyke/-persepsies van *Cannabis* en *Cannabis*-geïnfuseerde peuselhappies te verstaan. Toekomstige navorsing kan daarop fokus om 'n groter, meer veralgemeenbare steekproef van die Suid-Afrikaanse bevolking in te sluit om 'n in-diepte begrip van verbruikers-KHP met betrekking tot *Cannabis* en peuselhappies wat met *Cannabis* gefortifiseer is, te verkry. Verder, aangesien ouer ouderdom geassosieer was met meer ongunstige KHP teenoor *Cannabis*, kan toekomstige navorsing fokus op ouer generasies en hoe hulle hul inligting bekom. Sommige aanbevelings uit die studie behels die ontwikkeling van gereguleerde en geverifieerde peuselhappies wat met *Cannabis* aangevul is, aangesien onervare gebruik gekombineer met 'n ongereguleerde produk, verbruikers in gevaar kan stel. Vervolgens moet bemarkers dit oorweeg om verbruikersbewustheid te skep oor die fitochemikalieë wat in *Cannabis* voorkom, sowel as moontlike voordele en newe-effekte rakende *Cannabis*, meer spesifiek cannabidiol (CBD). Bemarkers kan ook hul bemarkingstrategieë oor die voordele van *Cannabis* na ouer generasies rig en verantwoordelike gebruik onder jonger geslagte bevorder. Laastens moet die omgewings- en ekonomiese potensiaal van *Cannabis* ook nie verontagsaam word nie, veral aangesien verbruikers meer bewus en besorg is oor die omgewing.

SLEUTELWOORDE

Cannabis Sativa; Hemp; Cannabidiol (CBD); Δ9-Tetrahydrocannabinol (THC); verbruikersgedrag; kennis; houding; praktyke/persepsie; KHP.

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CHAPTER 1 – INTRODUCTION

In this chapter, the study is introduced by means of a brief overview and background that summarises the researcher's interest in *Cannabis*, specifically fibre-type *Cannabis*. In addition, the problem statement, the justification of the study and a brief summary of the research aim and objectives is discussed. Furthermore, a brief outline of the research methodology is provided as well as the ethical clearance that was obtained for this study is discussed. Finally, the informational layout of the dissertation is presented.

1.1 OVERVIEW

Cannabis, an herbaceous plant, is classified under the *Cannabaceae* family with *Cannabis sativa, Cannabis indica* (Montserrat-de la Paz et al., 2014) and though still debated, *Cannabis ruderalis*, as the three main species in *Cannabis* (McPartland & Guy, 2017). *Cannabis sativa* contains an abundance of non-nutritive, bioactive phytochemicals known as phytocannabinoids with close to 120 of these phytocannabinoids reported as being identified (Hanuš et al., 2016). Whilst Δ9-tetrahydrocannabinol (THC) is present in higher quantities in the marijuana plant (drug-type *Cannabis*) and known to create psycho-activity in humans, cannabidiol (CBD) is more abundant in the hemp plant (fibre-type *Cannabis*) and does not have any intoxicating effects (Pavlovic et al., 2019).

The *Cannabis* plant was originally domesticated in China around 5,000 (Lu & Clarke, 1995; Amaducci et al., 2015) to 6,000 (Li, 1974) years ago and considered one of the oldest cultivated plants (Li, 1974). Since then, *Cannabis*, more specifically hemp, has been cultivated as a textile (Crini et al., 2020) and a source of food, fibre and medicine (Zeremski et al., 2016). However, during the 20th century, *Cannabis* production was overshadowed by cheaper petroleum-based products (Zuardi, 2006) and due to its association with Δ^9-tetrahydrocannabinol (THC) (Montserrat-de la Paz et al., 2014; Johnson, 2018; Mierliţă, 2019), hemp production almost came to a halt (Montserrat-de la Paz et al., 2014; Borkowska & Bialkowska, 2019).

In recent years, several countries such as the United States, Uruguay and Portugal have started to legalise *Cannabis* (Rolles et al., 2015; Ferreira, 2017) and after almost a century of being strictly prohibited in South Africa (Paterson, 2009), history was made when *Cannabis* was legalised for private use in 2018 (de Villiers, 2018). While the sale and distribution of THC-containing *Cannabis* remains prohibited, some cannabidiol products have either been lowered or removed as a scheduled drug (Government Gazette, 2020). Furthermore, the Draft National *Cannabis* Master Plan was drafted by the Department of Agriculture, Land Reform and Rural Development (Ramalepe, 2021) aimed at improving the country's economy by increasing *Cannabis* production and to gain investment for research within the industry (BusinessTech, 2021a). Subsequently, the market is expected to grow for the next 10 years at approximately 20% per annum (Wesgro, 2019).

In the agricultural sector, hemp has the ability to remediate contaminated soil (Adesina et al., 2020), is particularly resistant to diseases and pests (AgriFutures Australia, 2017) and can therefore preserve soil biodiversity (Cherney & Small, 2016). *Cannabis* is considered to be sustainable and versatile as most parts of the plant can be used (Montford & Small, 1999; Musio et al., 2018). Furthermore, compared to cotton, hemp fibre can reduce production costs by 78% (Schumacher et al., 2020) and the plant material can be used in the manufacture of clothing, paper, carpeting, cosmetics and food (Young, 2005; Crini et al., 2020). Edible hemp products include the hulled seed, hempseed oil and its by-product, hemp seed cake or meal (Malomo, 2015) which has been shown to be high in protein (Malomo, 2015) and useful as a food ingredient (Oomah et al., 2002). The dehulled seed has been successfully incorporated into dairy products, meat and bread to enhance their sensory properties as well as their nutritional value (Leonard et al., 2019).

While technically a nut (Callaway, 2004), the kernels are high in protein, a good source of fibre, rich in unsaturated fats (U.S. Department of Agriculture, 2015), high in vitamins (Orhan et al., 2000) and trace minerals (Mihoc et al., 2012). In addition, fibre-type *Cannabis* contains an abundance of phytochemicals found throughout the plant. The hemp seeds contain flavonoids, which have been related to a reduction in numerous diseases (Arts & Hollman, 2005) and the oil extracted from the seed is rich in antioxidants (Santos et al., 2013; Leonard et al., 2019). Furthermore, the essential oils extracted from inflorescences of the plant have analgesic, anxiolytic and anti-inflammatory properties (Baron et al., 2018) along with the ability to improve memory and learning (Wang et al., 2019).

While the phytochemicals present in the hemp plant have many benefits, interest in the phytocannabinoid, cannabidiol (CBD) has increased due to its pharmaceutical applications (Leonard et al., 2019). Cannabidiol has proven to have many benefits including acting as an antipsychotic (Batalla et al., 2021) and an anxiolytic (Stith et al., 2019; Batalla et al., 2021), it shows antibacterial activity (Iseppi et al., 2019), is an antioxidant (Cheng et al., 2014), is an anticancer agent (Cerino et al., 2020), it has antiemetic properties (Mersiades et al., 2020) and has analgesic and anti-inflammatory effects (Stith et al., 2019). The administration of CBD has also shown promise in the treatment of epilepsy (Szaflarski et al., 2018), in the management of substance abuse (Ren et al., 2009; Morgan et al., 2013; Copeland et al., 2015; Prud'homme & Jutras-Aswad., 2015; Shannon & Opila-Lehman, 2015; Gonzalez-Cuevas et al., 2018) and may contribute to preventing or delaying the development of cardiovascular diseases (Stanley et al., 2012).

In recent years, diet and lifestyle has been related to either preventing or increasing the risk of non-communicable diseases and consequently scientific focus has shifted to the concept of nutrition (Crescente et al., 2018). Conventional snacks, for instance, were normally low in nutritional value (Njike et al., 2016) but recently, consumers are demanding and willing to pay a premium for healthier snacks (Nielsen, 2018). In addition, snacks are seen as convenient as there is no need for preparation

(Ciurzyńska et al., 2019) and is a regular purchase amongst consumers (Mielmann & Brunner, 2018). As mentioned, including hemp seeds or any of its by-products in a snack should enhance the nutritional properties of the snack with some snacks, also known as edibles, already including CBD (Zootly, 2019; Livity Foods, 2020; Recess, 2020; Velobar, 2020; Cannabliss, 2022; Taste of Cannabis, 2022) but claiming CBD as a dietary supplement is still illegal in the United States (U.S. Food and Drug administration, 2020b). In addition, CBD is novel and there is limited research on its long-term effects (Iffland & Grotenhermen, 2017) and there has not yet been a validated assessment to verify the purity of the CBD content (Lachenmeier & Walch, 2020).

Currently, the possible side effects that may be linked to CBD ingestion include gastrointestinal distress (Lachenmeier & Walch, 2020), liver damage and hindrance of brain activity (U.S. Food and Drug administration, 2020c). Nonetheless, CBD and CBD-products are increasing in popularity amongst consumers in South Africa (Wesgro, 2019), Europe (Hudock, 2019), Canada and America (Kearney, 2018). Studies concerning consumer knowledge-attitude-perception/practice (KAP) towards *Cannabis* exist (Kearney, 2018; Giandelone & Luce, 2019; Hudock, 2019; Kruger et al., 2020; Wheeler et al., 2020; Zeiger et al., 2020; Hasan et al., 2021) but none focus on South African consumers. In addition, knowledge gaps are apparent amongst CBD users or prospective CBD users such as some consumers still believing that its ingestion produces intoxication (Hudock, 2019). Research involving the knowledge (K), attitude (A) and perception/practice (P) (KAP) model aims to measure knowledge that a population possesses on a certain topic, their attitude towards it and their behaviour concerning the topic (Kaliyaperumal, 2004). Different models of the knowledge-attitude-perception/practice triad exist with some authors suggesting a linear relationship (Akintunde, 2017; Iyer, 2018) whilst other authors suggest the model is triangular with the possibility of interrelations between model components (Schwartz, 1976; Valente et al., 1998; Baranowski et al., 2003; Bano et al., 2013; Zheng et al., 2018).

As the current study employed a KAP model, each of the components within the model was used to set the main objectives of the study. Whilst Brucks (1985) grouped the concept of knowledge into three categories, namely subjective knowledge, objective knowledge and consumer experience, the current study aimed to explore subjective and objective knowledge regarding *Cannabis*. In addition, the current study used a unidimensional attitudinal structure that focused on attitudes shifting between positive and negative (Samra, 2014). Finally, the current study considered practice and perception to be synonymous as seen in previous studies (Bargh et al., 1996; Dijksterhuis & van Knippenberg, 1998; Chartrand et al., 2005; Roussel & Frenay, 2019) and all these factors were ultimately considered in the current study to explore consumer KAP regarding *Cannabis* and *Cannabis*-infused snacks. The next section discusses the problem statement of the current study.

1.1 PROBLEM STATEMENT

As discussed in the previous section, the fibre-type *Cannabis* plant contains an abundance of nutrients and phytonutrients. However, *Cannabis* has been prohibited for almost the last century which restricted research as to possible benefits of fibre-type *Cannabis*. Furthermore, limited research exists on the knowledge-attitudes-perception/practice model in terms of *Cannabis* use and existing literature rather focuses on the prevention of psycho-active *Cannabis* use (Zeiger et al., 2020). This warrants the assessment of the KAP-model in terms of fibre-type *Cannabis*, especially amongst South African consumers, and in particular regarding its incorporation into snack foods. Table 1.1 depicts four of the first recent studies that appeared on the search result list of Google Scholar regarding consumer KAP towards *Cannabis*, using the key words "KAP" and "*Cannabis*".These studies were conducted mainly in the United States, Europe and Pakistan (Kruger et al., 2020; Wheeler et al., 2020; Zeiger et al., 2020; Hasan et al., 2021).

TABLE 1.1: RECENT STUDIES ON THE KAP MODEL REGARDING CANNABIS

Article	Description
1. Perception and practices regarding *Cannabis* consumption in Karachi, Pakistan: A cross-sectional study (Hasan et al., 2021)	This study aimed at establishing a baseline study on the perception, knowledge and practices regarding medical *Cannabis* amongst the Pakistani population and in particular, the source and amount of knowledge regarding *Cannabis* with attitudes being assessed using a five-point Likert scale and practices focussing on current or past *Cannabis* use. This study indicated an urgent need for awareness and educational programs, especially amongst lower socio-economic classes and females to ensure informed use, especially taking into consideration the medical benefits of *Cannabis*.
2. *Cannabis* enthusiasts' knowledge of medical treatment effectiveness and increased risks from *Cannabis* use (Kruger et al., 2020)	This study aimed to measure objective knowledge regarding use of *C. sativa* (L.). It found that the majority of participants had knowledge from their own experience. Only 18% of participants obtained information from medical providers, and those participants' objective knowledge was more accurate. Only 5% of participants had indicated that *Cannabis* use posed risks. In addition, participants viewed *Cannabis* use to be effective in the treatment of epilepsy (68%), cancer (76%) and depressive symptoms (72%). Finally, significant discrepancies were found in available, factual evidence and *Cannabis* users' knowledge.
3. CBD (Cannabidiol) Product Attitudes, Knowledge, and Use Among Young Adults (Wheeler et al., 2020)	This study focussed on the knowledge, attitudes and use of cannabidiol amongst young adults. It found that around 70% of respondents had heard of CBD, with around 40% who had used cannabidiol popularly consumed as edibles, tinctures and vape mostly for stress relief, relaxation and sleep improvement. It also reported that respondents would calculate dosage through guesswork. The study also found that respondents used CBD under the impression that it would have health benefits that had not yet been scientifically proven. Finally, the study found that respondents were not aware of legal and regulatory concerns.
4. Attitudes about *Cannabis* mediate the relationship between *Cannabis* knowledge	This study focussed on the knowledge, attitudes and use of cannabidiol amongst active adult athletes. This study grouped respondents into three categories namely Conservative, Unsure and Liberal. In this study, it was found that the Liberal group had more knowledge on *Cannabis*

and use in active adult athletes (Zeiger et al., 2020)	and that more positive attitudes toward *Cannabis* resulted in more knowledge regarding the topic. The Liberal group were also more likely to use *Cannabis*.

Table 1.1 indicates that some research has been conducted on the KAP towards *Cannabis* and all these studies found that there are considerable knowledge gaps amongst respondents. However, CBD products for private use are increasing in popularity amongst consumers across the globe, which include South African consumers (Kearney, 2018; Hudock, 2019; Wesgro, 2019). This raises the need to ascertain consumer's knowledge in addition to their knowledge gaps regarding *Cannabis* and to address their concerns by providing awareness on the risks of *Cannabis* and its by-products. The majority of American consumers, for instance, were uncertain about the required dosage and potency levels that is stated on labels (Giandelone & Luce, 2019) and this needs to be addressed by producers of *Cannabis* and *Cannabis*-infused products (Ash, 2019). In addition, there is uncertainty amongst consumers regarding the efficiency and safety of *Cannabis* (Cowling, 2020). This is supported by results from another survey which indicated that consumers who have used *Cannabis* had only a slightly better attitude, compared to non-users, towards *Cannabis* together with confidence in the effectivity, safety and usage thereof (Giandelone and Luce, 2019). With some forms of CBD now completely removed from the schedule (Schmidt, 2020), South African consumers have access to CBD based on relatively little research as to their attitude toward, perception/practice of and knowledge regarding CBD. In addition, the commercial aspects of sale of CBD products including cost, availability, purity and associated efficacy of such products has not yet been established, however requesting a certificate of analysis from the supplier would provide the consumer with more clarity (Ash, 2019).

At this stage, only one CBD product has been approved by the FDA (U.S. Food and Drug administration, 2020b) after extensive clinical trials that involved over 500 patients (U.S. Food and Drug administration, 2018). Currently, CBD is linked to side effects that may lead to liver problems, gastrointestinal distress and reduced brain activity (U.S. Food and Drug administration, 2020c), drowsiness, decreased appetite and poor quality of sleep (U.S. Food and Drug administration, 2018). Furthermore, limited research exists as to hormonal or other drug interactions following CBD ingestion nor the effect of long-term use (Iffland & Grotenhermen, 2017). Philpot et al. (2019) reported knowledge gaps amongst medical practitioners and that possible side effects of CBD may place both patients and medical practitioners at risk. In addition, concerns were raised because the majority of consumers used guesswork to dose CBD (Wheeler et al., 2020; Giandelone & Luce, 2019) and about a quarter of European (Hudock, 2019), American and Canadian (Kearney, 2018) consumers do not know the difference between CBD and THC. Thus, it can be assumed that South African consumers might have similar knowledge gaps regarding *Cannabis* rendering it imperative to determine their knowledge regarding *Cannabis*.

The South African market has products that include hemp seeds such as snacks, hemp seed protein and the seed itself, either hulled or unshelled. Consumers are, however, still uninformed regarding the

nutritional benefits associated with hemp, despite a considerable amount of scientific proof (Crescente et al., 2018; Cerino et al., 2020). Hemp and its by-products contain an abundance of nutrients with numerous remedial and health-promoting benefits. However, the negative association with marijuana hinders the advancement of hemp as a food source and there is a need to create awareness amongst consumers. Based on the problem statement discussed in this section, the following section will discuss the justification of this research.

1.2 JUSTIFICATION OF THE RESEARCH

As indicated in the problem statement, some international research exists on consumer knowledge, attitudes and perception/practice regarding *Cannabis* (Kearney, 2018; Giandelone & Luce, 2019; Hudock, 2019; Kruger et al., 2020; Wheeler et al., 2020; Zeiger et al., 2020; Hasan et al., 2021). However, there is limited research regarding South African consumer KAP regarding fibre-type *Cannabis*, specifically in food products. The current study aims to address this gap by exploring what the South African consumer knows of *Cannabis* in addition to their attitudes towards and perceives/practices regarding fibre-type *Cannabis*. While fibre-type *Cannabis* products may be included in a food and may contribute to nutritional benefits, it is also necessary to be aware of potential risks associated with CBD.

Since diet and lifestyle influence the prevalence, severity and likelihood of non-communicable diseases, research has been devoted to nutrition (Crescente et al., 2018). Furthermore, snacks are convenient and consumers demand healthier snacking options (Nielsen, 2014; Ciurzyńska et al., 2019; Nielsen, 2018). Thus, including hemp seeds or products of hemp seed in a snack could increase the intake of beneficial protein (Malomo, 2015; Leonard et al., 2020), unsaturated fat (Leizer et al., 2000; Oomah et al., 2002; Johnson, 2019) and fibre content (Callaway, 2004; U.S. Department of Agriculture, 2015; Leonard et al., 2020) as well as provide the consumer with phytochemicals that could assist with the prevention of various non-communicable diseases (Camire, 2002; Johnson & Williamson, 2003; Shahidi, 2005). Furthermore, essential oils and phytocannabinoids, specifically CBD, have been linked to several health and pharmaceutical benefits (Cheng et al., 2014; Mersiades et al., 2018; Szaflarski et al., 2018; Iseppi et al., 2019; Stith et al., 2019; Cerino et al., 2021). For this reason, CBD edibles have increased in popularity amongst consumers with numerous forms of edibles available on the market (Zootly, 2019; Livity Foods, 2020; Recess, 2020; Velobar, 2020; Cannabis Connect, 2021; Taste of Cannabis, 2022).

Cannabis was legalised in South Africa for private use in 2018 (de Villiers, 2018) with some forms of CBD becoming legal for sale and distribution (Government Gazette, 2020; Schmidt, 2020). This change in legislation created numerous opportunities within the food industry where CBD products are already available as an over-the-counter purchase in pharmacies and at online retailers. Even though CBD does

have several benefits, little is known on the possible long-term side effects of CBD use, how it differs from THC and how to safely consume *Cannabis*.

An opportunity to develop better marketing strategies exists to increase consumer awareness of fibre-type *Cannabis*. This could be achieved by exploring South African consumer KAP regarding *Cannabis*. Furthermore, improving consumer awareness regarding fibre-type *Cannabis* would not only increase consumer acceptance toward *Cannabis* but would also address knowledge gaps to ensure responsible and mindful use of fibre-type *Cannabis* and *Cannabis*-infused products. This warrants the exploration of the South African consumer's knowledge, attitude and perception/practice (KAP) towards *Cannabis* and *Cannabis*-infused snack foods.

1.3 RESEARCH AIM AND OBJECTIVES

This study aimed to explore the ***South African consumer knowledge, attitude and perception/practice (KAP) of Cannabis and Cannabis-infused snack foods*** and, consequently, the following objectives were formulated:

Objective 1: To explore South African consumers' knowledge regarding fibre-type *Cannabis*.

1.1 in terms of their subjective knowledge

1.2 in terms of their objective knowledge

Objective 2: To explore South African consumers' attitude towards fibre-type *Cannabis*.

Objective 3: To explore South African consumers' perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods.

1.4 RESEARCH DESIGN AND METHODOLOGY

This study adopted a qualitative research paradigm with an exploratory research design. This methodology was deemed appropriate to explore the South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snack foods. Furthermore, this study used non-probability or non-random sampling techniques as it was cost-effective and less time-consuming (Maree & Pietersen, 2016a). Such non-probability sampling techniques include convenience sampling, snowball or referral sampling and purposive sampling. Sampling was based on the following criteria:

Inclusion criteria:

- Participants had to be of South African nationality and be currently residing in South Africa.
- Participants had to be older than 18 years of age and give informed consent.
- Participants had to be able to understand and communicate effectively in English or Afrikaans.

- Participants had to have some knowledge or at least heard of the term "*Cannabis*" or any of the synonyms or slang words referring to "*Cannabis*".
- Participants had to be able to access the internet, Microsoft Teams© with a microphone and audio.

Exclusion criteria:

- Participants unwilling to partake in the study.
- Participants unwilling to answer questions regarding their feelings toward *Cannabis.*
- Participants not familiar with the term '*Cannabis*' or any of its synonyms.

Data were collected through individual interviews with the assistance of a semi-structured interview guide that contained open-ended questions. One-on-one interviews were held to ensure that participants were not intimidated by the presence of other participants (Kumar, 2011) in addition to ensuring accuracy in determining participant objective knowledge (Dawson, 2002). Furthermore, individual interviews allow for more in-depth data collection (Schwab, 2020).

In addition to the individual interviews were two focus groups where similarities and differences were demonstrated between participants to enhance the richness of the research data (Lambert & Loiselle, 2007) and a homogenous group was able to encourage participants to share more of their experiences and opinions with the interviewer (Krueger & Casey, 2014). Therefore, one focus group consisted of participants who had previously used *Cannabis* while the other focus group consisted of participants who had not used *Cannabis*. The focus groups were led by a semi-structured interview guide that contained open-ended questions.

This study was conducted during the COVID-19 pandemic. The COVID-19 Coronavirus is highly infectious and the spread of the disease is largely controlled through social distancing (Centers for Disease Control and Prevention, 2021). The interviews and focus groups were therefore held on Microsoft Teams© so as to prevent physical interaction (Molla, 2020). Conducting the interviews and focus groups on Microsoft Teams© had some restrictions such as class bias (Babbie, 2008) and limiting access to non-verbal cues. However, this approach was cost-effective (Ryan et al., 2009) and the researcher could digitally record the proceedings (Microsoft, 2021).

The data collection instruments were pilot tested to trial their viability (Kothari, 2004) before commencing with data collection. Two pilot tests were conducted on Microsoft Teams© to test both the focus group moderator guide and the individual interview guide. Participants for the pilot test were recruited with convenience sampling and slight changes were made to the data instruments to improve the flow of the conversation during the interview. This included some changes to the order of the questions asked and rewording some of the questions to better address the research aim and objectives of the study.

A total of 23 individual interviews were conducted until data saturation was reached before another two interviews were conducted to confirm data saturation. In addition, the researcher held two additional focus groups supplemental to the individual interviews. The two focus groups only acted as supplemental to the interviews and were not necessarily held until the point of data saturation. The *Cannabis* non-user focus group consisted of five participants and the *Cannabis* user focus group consisted of six participants. Therefore, a total of 36 participants were included in this study. The individual interviews took 20 minutes whilst the focus groups lasted 40 minutes on average. Participants willing to participate in the study were sent the consent form and other documentation that needed to be completed and signed before commencing with the study. The participants needed to communicate a convenient time when the interview/focus group should take place and the researcher then scheduled the interview/focus group accordingly. Microsoft Teams© allowed the participants to use pseudonyms to further protect their identity and those partaking in the focus groups were made aware that they would be participating in a group format. Participants were also encouraged to switch off their cameras, not only to protect their identity if they wished to do so, but primarily to prevent the call from lagging and preserving the value of the data as far possible. As soon as the interview or focus group started, participants were reminded that the interview or focus group was being recorded, that their participation in the study was voluntary and that they were free to withdraw from the study without needing to give a reason.

The digital recordings were downloaded from Microsoft Teams© and then transcribed on Microsoft Word®, directly after the interview or focus group occurred. The researcher also requested each participant to review their transcription along with the interview recordings to discuss or approve the accuracy of the transcription and to clarify any misinterpretations. The process of transcribing data is a vital part in interpreting, making sense of the data and also plays a role in the analytical process (Roulston, 2017) and therefore the researcher opted to personally transcribe the recordings. Transcriptions were stored electronically which will be destroyed after a period of five years. The transcriptions were analysed by means of content analysis that assists the researcher in exploring participant attitudes, behaviours, emotions, opinions and values (Crosley, 2021) in addition to identifying concepts, patterns or themes from content such as recorded text from interviews (Luo, 2019). Finally, diagrams, tables and figures were used to visually display the gathered data which assisted with the data-interpretation process (Lewis, 2015).

1.5 ETHICAL CONSIDERATIONS

The Oxford Dictionary (2020) defines ethics as an activity or behaviour that is guided by moral principles. Ethics in research therefore refers to a research process based on moral principles that is accurately presented, based on the truth and is without plagiarism (Brink et al., 2018). Furthermore, in the field of social research, participants should be treated with respect and not harmed (Marvasti, 2004). The researcher has the responsibility to be considerate towards participants and their information

(Dawson, 2002). Therefore, before commencing with the research study and data collection process, ethical clearance was obtained from the College of Agriculture and Environmental Sciences Health Research Ethics Committee (HREC) at the University of South Africa (UNISA). This ensured the use of internationally recognised ethical principles that ensure anonymity, confidentiality and privacy of participants during the research process (University of South Africa, 2016). Appendix A contains the CAES Ethics Approval attached (Reference no.: 2021/CAES_HREC/038).

The researcher approached the participants in a respectful manner and initially obtained verbal consent from each. After verbally agreeing to partake in the study, prospective participants then received an information sheet that briefly described the data collection procedure and the possible benefits of the study. The information sheet emphasized that participation was voluntary, that participants could leave the study at any time, possible risks associated with participation, that no incentives would be provided to partake in the study and, finally, how participant anonymity would be ensured. The individual interviews and focus groups had different information sheets (Appendix B – Individual interviews; Appendix C – Focus group) that were presented in English. Furthermore, participants were required to sign an informed consent form (Appendix D – Individual interviews; Appendix E – Focus group) and had the opportunity to ask any questions they deemed necessary. The researcher ensured that all the documentation supplied to prospective participants was comprehensible, unambiguous and clear. Upon starting with the interview or focus group, the researcher would reiterate important information, including the fact that study data would be kept on a thumb drive locked in an office, and participants were granted a final opportunity to ask questions if they were unsure.

1.6 OUTLINE OF THE DISSERTATION

This dissertation consists of six chapters:

Chapter 1: This chapter introduces the study with a brief overview and background that summarises the researcher's interest in fibre-type *Cannabis*. The problem statement and the justification of the study is presented as are the research aim and objectives. Furthermore, a short summary of the research methodology is provided, the ethical clearance obtained for this study is discussed and chapter layout of the dissertation.

Chapter 2: This chapter provides a literature review of *Cannabis sativa*. Firstly, the difference between fibre-type and drug-type *Cannabis* is discussed and uses of hemp are explored, highlighting the use of hemp in food. Furthermore, factors such as the nutritional composition, benefits and possible concerns regarding hemp are discussed. Finally, the history of South African legislation regarding *Cannabis* is discussed in addition to possible future developments and opportunities.

Chapter 3: This chapter provides insights into the knowledge-attitude-perception/practice (KAP) model that will be used to explore South African consumer KAP of *Cannabis* and *Cannabis*-infused snack foods.

Chapter 4: The methodology applied to address the research objectives of the study is discussed in this chapter. This chapter elaborates on the proposed paradigm, research design, research setting, sampling strategy that contain inclusion and exclusion criteria, data collection and analysis methods, the trustworthiness and ethical considerations within the study.

Chapter 5: This chapter discusses the findings from the data collection instruments according to the aim and objectives of the study. Various themes that emerged from the findings are presented in the form of tables and figures.

Chapter 6: Conclusions from the research are presented in this chapter in relation to the study objectives. Furthermore, this chapter discusses the contributions and limitations of the study and provides recommendations for future research. These recommendations are made regarding *Cannabis* including the use of *Cannabis* in the food industry, based on the findings of consumer knowledge, attitudes and perception/practice regarding *Cannabis* and the need for further research and provision of information on *Cannabis* and *Cannabis*-infused snacks.

1.7 ACADEMIC-RELATED INFORMATION

The Harvard-referencing style was used in this dissertation which was also submitted to a plagiarism detection software, Turnitin©. The Turnitin© analysis figure is included in Appendix F. The most significant findings from this study will be prepared as a publication which will be submitted to an accredited, peer-reviewed journal. The current study has not been presented at any national or international conference.

1.8 CONCLUSION

This chapter introduced the study through an overview and background of the researcher's interest in the benefits of *Cannabis*, specifically fibre-type *Cannabis*. In addition, the problem statement and the justification of the study was discussed and the study research aim and objectives presented. Furthermore, a short summary of the research methodology was provided together with ethical considerations associated with the study. Finally, the layout of the dissertation is presented with a short summary of each chapter. The following Chapter 2 will discuss a literature review of the study with an in-depth discussion of fibre-type *Cannabis*. In addition, other aspects such as its origin, uses, possible benefits and risks as well as the history of *Cannabis* legislation in South Africa will be discussed.

CHAPTER 2 – LITERATURE REVIEW

2.1 INTRODUCTION

This chapter provides an overview of *Cannabis sativa* that focusses specifically on fibre-type *Cannabis*, also known as hemp. Firstly, background information is provided of *Cannabis sativa*, which differentiates fibre-type (hemp) from drug-type (marijuana) *Cannabis*. Next, the historic and current uses of hemp in different industries are explored, highlighting the use of hemp as a source of food or its inclusion in food.

This is followed by the nutritional composition and health-promoting compounds and benefits in hemp balanced by possible concerns and side effects associated with fibre-type *Cannabis.* This chapter also investigates snacking, its definition and how *Cannabis* can be incorporated into a snack. The history of South African legislation regarding *Cannabis* is also discussed as well as changes to the legislation and possible future developments and opportunities regarding *Cannabis*.

2.2 CHEMICAL COMPOSITION OF HEMP

Hemp, also known as *Cannabis sativa*, is an herbaceous plant that grows annually and is one of the three main species of *Cannabis* classified under the *Cannabaceae* family (Montserrat-de la Paz et al., 2014). There are two main varietals of *Cannabis sativa* that require differentiation: marijuana (or drug-type *Cannabis sativa*) contains high concentrations of Δ^9-Tetrahydrocannabinol (THC) that are sufficient to cause euphoria or intoxication in humans (Cherney & Small, 2016); and hemp (or fibre-type *Cannabis sativa*) contains significantly lower amounts of THC and produces no psycho-activity (Pavlovic et al., 2019). Cannabidiol (CBD) is present in higher quantities than THC in fibre-type *Cannabis*, whereas drug-type *Cannabis* contain more THC than CBD (Ross et al., 2000).

Figure 2.1 shows the basic morphological differences between marijuana and hemp *Cannabis* plants that largely result from the purpose for which the plant is cultivated. Hemp is mainly cultivated for its fibrous stalks (Malomo, 2015) whereas marijuana is cultivated for use of the flower (or buds) which contain the psycho-active component THC (VanDolah et al., 2019). The marijuana plant is, therefore, shorter in height with more branching and flowering whereas the hemp plant is taller and the stems/stalks are more robust (Small & Marcus, 2002).

FIGURE 2.1: HEMP PLANT (LEFT) AND MARIJUANA PLANT (RIGHT) ADOPTED FROM ENCORE LABS (2019).

Both THC and CBD form part of a larger group of bioactive phytochemical compounds present in plants (Whitney & Rolfes, 2011) that are non-nutritive and contribute to the plant colour and flavour (Johnson & Williamson, 2003). Phytochemicals present in *Cannabis* are also known as phytocannabinoids that may be present in nature but are mainly found in *Cannabis* species. Since the discovery of the first phytocannabinoid (Cannabinol or CBN) in 1940 (Pertwee, 2006), close to 120 such compounds have been identified (Hanuš et al., 2016). Interestingly, CBD was also discovered in 1940 two years prior to THC (Pertwee, 2006). Figure 2.2 shows the structural differences between CBD and THC. Although similar, THC contains a closed ring responsible for its pharmacodynamic-quality and is the main distinguishing structural feature compared to CBD (Sarill, 2019). The next section will discuss the uses of fibre-type *Cannabis*.

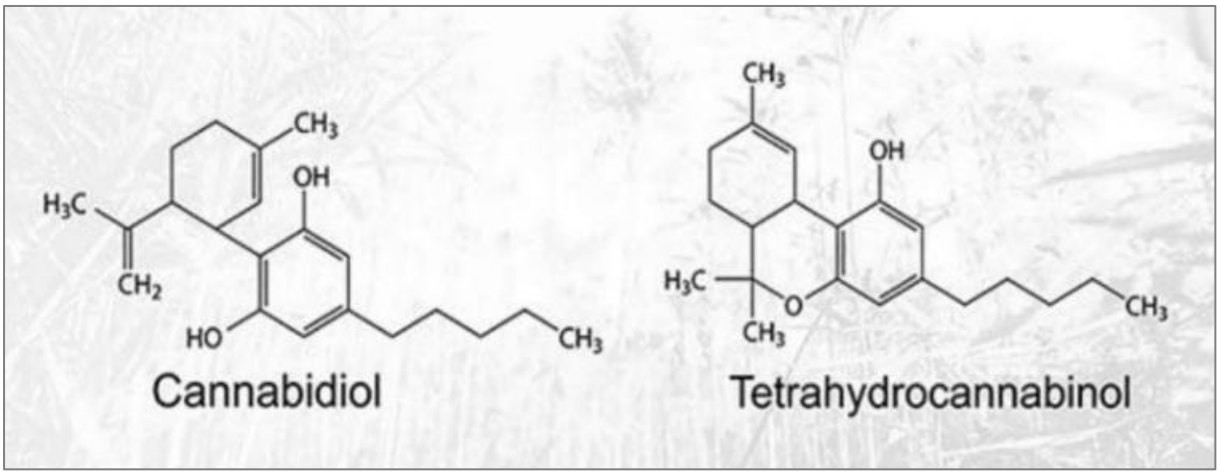

FIGURE 2.2: STRUCTURAL DIFFERENCES BETWEEN CBD AND THC ADOPTED FROM SARILL (2019).

2.3 USES OF HEMP

Cannabis is considered native to Western and Central Asia (Montserrat-de la Paz et al., 2014; Malomo, 2015) and, according to archaeological evidence, the oldest cultivated plant (Li, 1974), which was

initially domesticated in China 5,000 (Lu & Clarke, 1995; Amaducci et al., 2015) to 6,000 (Li, 1974) years ago. Hemp has since been cultivated as a vital food source, medicine and fibre (Zeremski et al., 2016) as well as a textile component with the first American flag being made from hemp (Crini et al., 2020). It is considered to be a versatile plant since most parts of the plant can be used (Musio et al., 2018). Some of these uses can be seen in Figure 2.3.

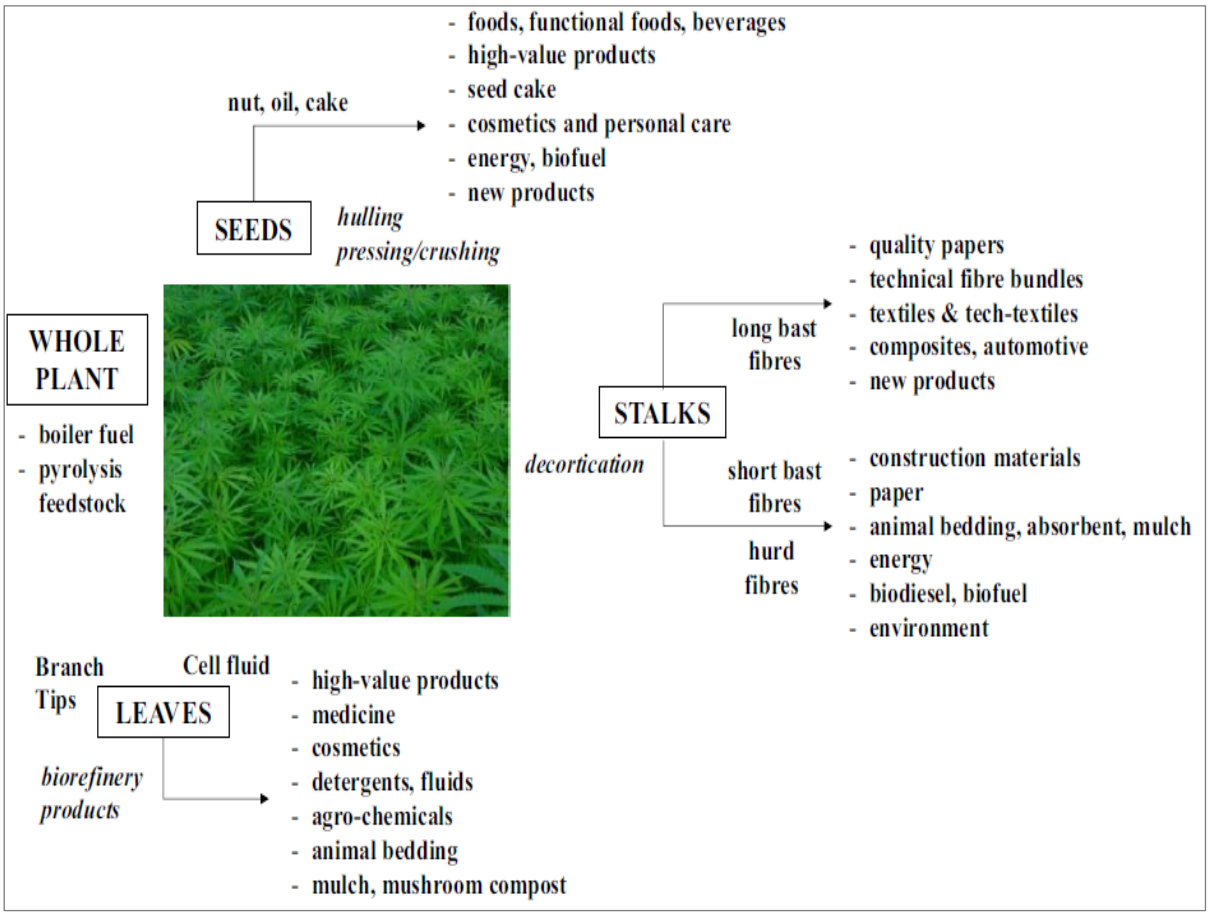

FIGURE 2.3: USES OF HEMP ADOPTED FROM CRINI ET AL. (2020).

In the 20th century, the farming, processing and subsequently the marketing of hemp was overshadowed by cheaper petroleum-based products (Zuardi, 2006). In addition, with the prohibition of the cultivation on all *Cannabis* species due to its association with Δ^9-Tetrahydrocannabinol (THC) and its intoxicating effects (Montserrat-de la Paz et al., 2014; Johnson, 2018; Mierliță, 2019), hemp production almost came to a halt (Montserrat-de la Paz et al., 2014; Borkowska & Bialkowska, 2019). More recently, hemp's nutritional and pharmaceutical values have sparked a new-found interest in this plant (Leonard et al., 2020). This is reflected in the increased number of publications regarding hemp that have increased from around 515 in the late 1980s to around 2983 between 2000 and 2004 (Zuardi, 2006).

Hemp cultivation was legalised in certain parts of the world (Montserrat-de la Paz et al., 2014; Johnson, 2018; Mierliță, 2019) on condition that the standard THC levels in these hemp plants were less than a specified amount of the dried *Cannabis* material weight. In certain European countries, THC levels

should not exceed 0.2% (Sîrbu et al., 2019). In the United States of America (USA) (Leonard et al., 2020; U.S. Food and Drug Administration, 2020a), Serbia (Zeremski et al., 2016) and Canada (Government of Canada, 2020), THC levels are acceptable up to 0.3% while the allowable limit is up to 1% in Switzerland (Herzog, 2017). Consequently, hemp is now commercially grown in Europe, the USA and Canada (Montserrat-de la Paz et al., 2014; Malomo, 2015) with the majority of hemp still being grown in China (Salentijn et al., 2015; Cherney & Small, 2016). Hemp is currently included in the production of durable fabrics, speciality papers (Callaway, 2004), cosmetics and, when processed, in the construction industry (Johnson, 2018).

Hemp fibre is considered a more sustainable option to cotton, showing around a 78% reduction in agricultural and production costs (Schumacher et al., 2020). In addition, compared to potato farming, the hemp plant does not require extensive use of biocides and has proven to be a useful rotational crop (Montford & Small, 1999). Gorchs et al. (2017), for instance, found that, under rain-fed Mediterranean conditions, hemp has the potential to being a successful predecessor for wheat. In addition to sustainable agriculture, processing of hemp plant material has resulted in many hemp-based products ranging from clothing, cosmetics, paper and carpeting to foods and snacks (Young, 2005; Crini et al., 2020).

Claims surrounding the sustainability and environmental benefits of hemp agriculture may, however, be overinflated, as, in addition to a high-water requirement, hemp seed crops require relatively high quantities of phosphorus (P), potassium (K) and nitrogen (N) (Cherney & Small, 2016). Yet, hemp cultivation shows benefits and is considered sustainable due to the fact that most parts of the plant can be used (Montford & Small, 1999; Musio et al., 2018), factors that contribute to global food security and sustainability (Schultz et al., 2020). As indicated, hemp cultivation has the potential to remediate contaminated soil (Adesina et al., 2020) and the crop is resistant to pests and disease (AgriFutures Australia, 2017). In the cases where pests and disease were detected, their presence did not substantially reduce the *Cannabis* yield. The reduction in use of pesticides further reduces production costs and ensures preservation of soil biodiversity (Cherney & Small, 2016). The next section will elaborate on fibre-type *Cannabis* as a food source.

2.4 HEMP AS A FOOD SOURCE

Besides the fibre and stalks, the hemp kernel has proved to be a versatile ingredient in food production (Oomah et al., 2002) which can unlock numerous opportunities in the South African market. In addition, the inclusion of hemp oil or hemp meal in animal feed has shown promise by increasing milk yield and nutritive quality (Mierliţă, 2018) as well as oxidative stability in egg yolks (Mierliţă, 2019). Edible hemp products include the hulled seed, hempseed oil and its by-product, hemp seed cake or meal (Malomo, 2015). Historically, hemp seeds including the hull were crushed and eaten almost like peanut butter (Crescente et al., 2018) and the removal of the hull is considered a recent development (Small &

Marcus, 2002). This allowed the dehulled hemp seed and/or its by-products to be successfully incorporated into bread, dairy products, meat and energy bars to not only enhance their nutritional value, but also their sensory properties (Leonard et al., 2020). HANS Brainfood, for instance, built their brand around hemp seeds and their by-products, such as hemp seed protein, claiming that their products "contain nutrients whose positive effects on cognition, the psyche, and the nervous system have been scientifically proven" (HANS Brainfood, 2020).

The hemp seed is achene (Crescente et al., 2018), consisting of fruitlets which contain the true seed that nearly fills the pericarp, and does not split open when the seeds are ripe (Gudin, 2017). The hulled seed is greenish-grey in colour (Sîrbu et al., 2019), around 3.0-5.0 mm in diameter (Leonard et al., 2020) and has a pleasant, nutty taste (Small & Marcus, 2002). It is oval or spherical in shape with green spots due to plant tissue beneath the epidermis (Crescente et al., 2018). Figure 2.4 shows the unshelled seed as well as the shelled seed with the green specks.

FIGURE 2.4: (A) UNSHELLED HEMP SEEDS ADOPTED FROM FENDERSON (2006); (B) HULLED HEMP HEARTS ADOPTED FROM KOVÁŘ (2009).

There is an increasing number of hemp seed products available on the South African food market. Figure 2.5 shows some of the products available on the South African market that depict the different components of the hemp plant used in food and drink products. The Seed Oil SA© company (2020) produces a cold-pressed hemp seed oil, whilst Woolworths© (2020) includes the whole hemp seeds in their cashew and strawberry snack bars. My Wellness© (2020) supplies a hemp seed protein that is claimed to be vegan, free from known allergens and contains 51% protein. Finally, Poison City Brewing developed a beer by replacing some of the hops with *Cannabis* leaves from the hemp plant (de Villiers, 2018a; Poison City Brewing, 2020). It is interesting to note that some hemp seed products contain an illustration of the *Cannabis* leaf on the packaging.

FIGURE 2.5: SOME COMMERCIAL HEMP PRODUCTS AVAILABLE IN SOUTH AFRICA. (A) HEMP SEED OIL PRODUCED BY SEED OIL SA, (2020); (B) CASHEW AND STRAWBERRY SNACK BAR SOLD BY WOOLWORTHS© (2020); (C) HEMP SEED PROTEIN PRODUCED BY MY WELLNESS (2020); (D) DURBAN POISON BEER FROM POISON CITY BREWING (2020).

The next section will discuss the different oils made from fibre-type *Cannabis* that may be used in food or pharmaceutical applications.

2.5 HEMP OILS

A clear distinction should be made between hempseed oil, hemp essential oil and CBD oil. Hempseed oil is obtained from pressing the oil from the hemp seed leaving a high-protein cake or meal as by-product (Malomo, 2015). Due to contamination during the pressing of the hemp seed, CBD can be present in hempseed oil (Grotenhermen et al., 1998). Hemp essential oil contains an array of phytochemicals, including CBD, and is obtained from the inflorescences or the whole plant through steam sterilisation (Iseppi et al., 2019).

Extraction of CBD oil mainly involves the aerial parts of the plants, such as the leaves, flowers and stems (VanDolah et al., 2019). There are several methods of extraction, some being more or less effective, which impact on the quality of the CBD (Walter, 2020). The extraction of CBD usually involves chemical or non-chemical solvent extraction or lipid/ethanol infusions (Johnson, 2019) with carbon dioxide extraction the preferred extraction method able to extract up to 90% of CBD available in the plant (VanDolah et al., 2019; Firstcrop, 2020). The CBD is extracted as cannabidiolic acid (CBDA) with therapeutic properties and applications different from CBD and, as with THC, CBD therefore requires decarboxylation (Sigman, 2020). The process of decarboxylation involves heating, which is aimed at activating the phytocannabinoids and converting the acidic CBDA to its neutral form, CBD (Lynch, 2020).

The next step is winterisation or short path distillation which aims at separating the CBD from the remaining matter (Walter, 2020). The extent of separation would either result in full-spectrum CBD,

broad spectrum CBD or CBD isolate (Higdon, 2020). Full-spectrum CBD includes terpenes, other cannabinoids such as cannabigerol (CBG) or cannabinol (CBN) as well as less than 0.3% THC (Royal CBD, 2021). However, this low dosage will not have an intoxicating effect (Coelho, 2020a). Full-spectrum oil typically contains around 50 - 75% CBD (Higdon, 2020). Broad-spectrum CBD typically does not contain THC, but other phytochemicals are still present (Coelho, 2020a) and consequently, CBD content increases to roughly 80% (Higdon, 2020). Some research suggests that using the phytocannabinoids together might be more effective, which is also known as the entourage effect, but this has not yet been scientifically proven (Coelho, 2020b). Finally, CBD isolate is 99% pure CBD that usually comes in the form of crystals (Leonard, 2020) that do not contain any additional compounds (Royal CBD, 2021). The CBD extract is then blended with a carrier oil, usually hemp seed or coconut oil, to assist with absorption in the body (Higdon, 2020). Figure 2.6 illustrates the differences between full-spectrum CBD, broad spectrum CBD and CBD isolate.

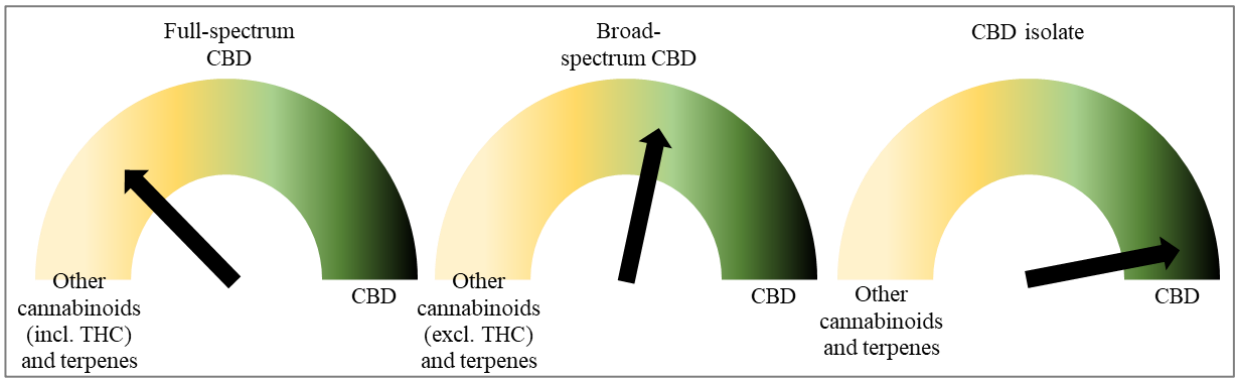

FIGURE 2.6: FULL-SPECTRUM CBD, BROAD-SPECTRUM CBD AND CBD ISOLATE.

In spite of the many benefits associated with edible hemp products such as oils, protein powders and snacks, it is the association of hemp with the intoxicating effects of the THC in marijuana (Montserrat-de la Paz et al., 2014) that complicates the marketing of hemp and increases the need for knowledge of hemp amongst consumers (Department of Agriculture, Forestry and Fisheries: South Africa, 2010). Marijuana is still one of the most common drugs being abused (National Center for Drug Abuse Statistics, 2021) and compared to CBD, THC has been the main focus of attention (Brenneisen, 2007). This dissertation will, however, focus on cannabidiol as its medical, pharmaceutical (Cherney & Small, 2016) as well as food applications are growing in appeal. The next section will discuss the nutritional benefits and health-promoting compounds within fibre-type *Cannabis*.

2.6 NUTRITIONAL COMPOSITION, HEALTH-PROMOTING COMPOUNDS AND BENEFITS OF HEMP

Recently, the concept of nutrition has reached a greater degree of scientific attention with numerous reports describing diet- and lifestyle-related non-communicable diseases (Crescente et al., 2018). One of the focus areas in research is to improve and design food that supports optimum health as well as reduce the risk of disease (Holdt & Kraan, 2011). However, many consumers are still uninformed

regarding the nutritional benefits associated with hemp, despite a considerable amount of scientific proof (Crescente et al., 2018; Leonard et al., 2020; Cerino et al., 2021). The following section will discuss the nutritional composition, the health-promoting compounds and benefits in hemp seeds. These are illustrated in Figure 2.7.

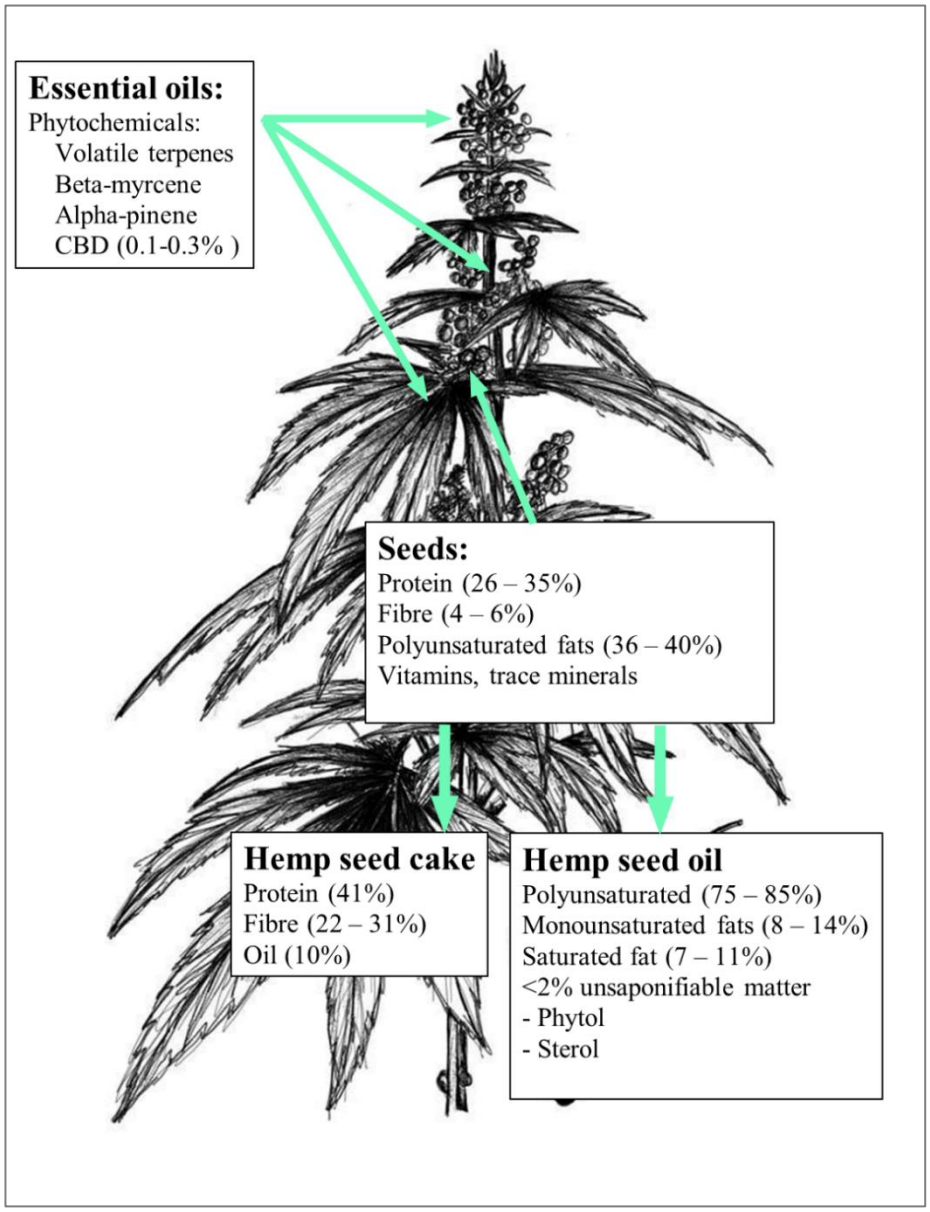

FIGURE 2.7: NUTRITIONAL COMPOSITION AND HEALTH PROMOTING COMPOUNDS IN HEMP. IMAGE ADAPTED FROM GRIFFIOEN (PERS. COMM., 2021) AND PERMISSION GRANTED TO EDIT IMAGE IS PROVIDED IN APPENDIX G.

Note: References used to prepare the data in Figure 2.7 include Callaway (2004); U.S. Department of Agriculture (2015); Hazekamp et al. (2016); Pellati et al. (2018); Iseppi et al. (2019); Johnson (2019); House et al. (2020) and Leonard et al. (2020).

2.6.1 Nutritional composition of hemp seeds

While technically a nut (Callaway, 2004), the hemp hearts (or seeds) were initially a by-product of the plant but have proven to be a source of a nutrient-dense oil and protein-rich cake or meal (Malomo,

2015). The protein-rich cake is a by-product from the oil extraction with great antioxidant properties (Leonard et al., 2020). The pressed cake contains around 10% residue oil, 41% crude protein and 22 – 31% fibre (House et al., 2020). According to Table 2.1, hulled hemp seeds are high in protein (26 – 35%), a good source of fibre (4 – 6%) and a rich source of polyunsaturated fats (36 – 40%) (U.S. Department of Agriculture, 2015). Hemp seeds are also high in vitamins (Orhan et al., 2000) and trace minerals (Mihoc et al., 2012). The seeds, furthermore, contain a ratio of 20:80 water-soluble and water-insoluble fibre (Callaway, 2004), with the majority of the fibre existing in the hull (Leonard et al., 2020). Based on Table 2.1 and the South African Labelling and Advertising of Foodstuffs Act 54 (Government Gazette, 2010), hulled hemp seeds qualify for a "source of fibre" claim. The inclusion of fibre-rich foods in one's diet has been related to numerous health benefits such as a reduction in heart disease as well as the lowering of blood cholesterol levels (Whitney & Rolfes, 2011).

TABLE 2.1: TYPICAL NUTRITIONAL INFORMATION OF HEMP SEEDS ADOPTED FROM U.S. DEPARTMENT OF AGRICULTURE (2015).

Typical Nutritional Information Average values	**Values per 100 g**	
Energy	2313	kJ
Protein	31.6	g
Carbohydrates	8.7	g
of which total sugar	1.5	g
Total fat	48.8	g
of which saturated fat	4.6	g
of which trans fat	0.0	g
of which monounsaturated fat	5.4	g
of which polyunsaturated fat	38.1	g
Cholesterol	0	mg
Dietary fibre#	4.0	g
Sodium	5	mg

Hemp seeds contain albumin and edistin that are high-quality storage, easily digestible protein types (Callaway, 2004) with different functional properties and amino acid profiles (Leonard et al., 2020). In addition, most of the essential amino acids are present in hemp seeds as well as high levels of the non-essential amino acids, arginine and glutamic acid (Callaway, 2004; Leonard et al., 2020). Arginine improves blood circulation and building of proteins (MayoClinic Staff, 2021), while glutamic acid is vital during neurotransmission in the brain and contributes to memory and learning (Poulson et al., 2021). However, like most plant proteins (Galili & Amir, 2012), they are particularly low in the essential amino acid, lysine (Leonard et al., 2020). The human body does not produce essential amino acids and so these should be supplied by dietary intake (Whitney & Rolfes, 2011).

Hemp seeds are crushed or pressed to extract an oil (Johnson, 2019) that, like most vegetable oils, consists mostly of unsaturated fatty acids so that polyunsaturated fats are at highest concentration (75 – 85%), followed by monounsaturated fats (8 – 14%) and saturated fat (7 – 11%). The 1:3 ratio of alpha-linolenic (18:3 omega-3) and linoleic (18:2 omega-6) acids is considered a perfect balance for human nutrition (Oomah et al., 2002). This ratio allows the fatty acid metabolic pathways in the body to work effectively and inhibits over-accumulation of certain metabolic products (Leizer et al., 2000). Furthermore, evidence suggests that the consumption of hempseed oil leads to an improvement in acute as well as chronic conditions such as skin problems and inflammatory diseases (Callaway, 2004).

2.6.2 Health-promoting *Cannabis sativa* (L.) compounds

One of the strategies in preventing non-communicable disease includes the enrichment of food products with bioactive compounds (Saleh et al., 2018). These bioactive compounds are known as phytochemicals that, as previously discussed, are present in plants and associated with various health benefits (Shahidi et al., 2008). Some of these health benefits include the prevention of cholesterol oxidation and reduction of free radicals that contribute to cancer prevention (Camire, 2002; Johnson & Williamson, 2003; Shahidi, 2005). Foods enhanced with additional nutritional benefits whilst still resembling the traditional food are described as functional foods (Shahidi, 2005). Evidence shows that functional foods may improve various chronic diseases such as Type 2 diabetes but when consumed in excess they may cause toxicity (Martirosyan & Miller, 2018). Fibre-type *Cannabis* contains an abundance of phytochemicals throughout the plant.

The hemp kernel itself contains phytonutrients that contribute to its nutritional value and its efficiency as a functional food (Leizer et al., 2000). Audu et al. (2014) determined the presence of flavonoids in hemp seeds, which have been related to a reduction in the risk of cancers, cardiovascular disorders and neurodegenerative diseases (Arts & Hollman, 2005). Furthermore, hemp oil, derived from the seed, contains less than 2% unsaponifiable matter, with high quantities of phytol, sterol and tocopherol (Leonard et al., 2020). Phytol, a constituent of chlorophyll, has been studied due to the possibility of having antioxidant (Santos et al., 2013), anticancer and immune-enhancing properties (Jeong et al., 2018). Sterols, specifically beta-sitosterol and campsterol (Montserrat-de la Paz et al., 2014), are associated with the lowering of low density lipoprotein-cholesterol (LDL-cholesterol) which is known to contribute to cardiovascular disease (Patch et al., 2006). Finally, tocopherol, or Vitamin E, has been proven to be an effective antioxidant (Leonard et al., 2020).

Essential oils extracted from *Cannabis sativa* inflorescences were shown to contain chemical compounds known as volatile terpenes, responsible for the plant's aromatic properties (Hazekamp et al., 2016). Both Pellati et al. (2018) and Iseppi et al. (2019) concluded that beta-myrcene and alpha-pinene in *C. sativa* plants to be the most abundantly available terpenes in samples of analysed essential oils. Beta-myrcene in *Cannabis* is believed to cause its sedative effects (Wang et al., 2019) as well as

have analgesic, anxiolytic and anti-inflammatory properties (Baron et al., 2018). Alpha-pinene is deemed to improve memory and learning as it inhibits acetylcholinesterase (Wang et al., 2019). However, it should be noted that these beneficial effects may result from complicated, synergistic interaction between *Cannabis* phytochemicals and so conflicting results of independent studies on *Cannabis* reflect the limitations of research involving single compounds selected as indicators (Hazekamp et al., 2016).

Although essential oils from hemp have also shown the presence of cannabidiol (CBD) in concentrations between 0.1-0.3% (Iseppi et al., 2019), THC is the cannabinoid that has attracted the most scientific attention (Brenneisen, 2007). However, a growing interest is being shown in cannabidiol (CBD) for both its medical and pharmaceutical applications (Cherney & Small, 2016). In this regard, research has shown that CBD, to some extent, has antagonistic effects on THC, predominantly in the brain (Zuardi, 2008; McPartland et al., 2014). In fact, CBD has been suggested to have beneficial properties in brain activity with antipsychotic (Batalla et al., 2021) and anxiolytic effects (Stith et al., 2019; Batalla et al., 2021) which could aid in the treatment of some mental disorders. Furthermore, Pretzsch et al. (2019) analysed the impact of CBD on brain activity, including volunteers with autism spectrum disorder (ASD) and, even though further studies are required, found that CBD could treat symptoms of ASD.

Other potential benefits of CBD include its anti-bacterial activity (Iseppi et al., 2019), immune modulation and anticancer activity (Cerino et al., 2021), antiemetic activity (Mersiades et al., 2018), antioxidant activity (Cheng et al., 2014), analgesic and anti-inflammatory effects (Stith et al., 2019) while also showing favourable results when used to treat epilepsy (Szaflarski et al., 2018). Furthermore, CBD may contribute towards preventing or delaying the development of cardiovascular diseases by influencing the migration, survival and death of white blood cells (Stanley et al., 2012). Moreover, CBD may contribute to reducing blood pressure (Jadoon et al., 2017) due to the beneficial haemodynamic effects which may ultimately reduce the risk of stroke and myocardial infarction (Sultan et al., 2017). In addition, the administration of CBD has shown promise in the management of substance abuse involving nicotine (Morgan et al., 2013; Prud'homme & Jutras-Aswad., 2015), marijuana (Copeland et al., 2015; Shannon & Opila-Lehman, 2015), heroin (Ren et al., 2009) as well as alcohol (Gonzalez-Cuevas et al., 2018). The next section will discuss how *Cannabis* and its beneficial phytochemicals may contribute to the fight against COVID-19.

2.6.3 *Cannabis* use and COVID-19

Several cases of 'viral pneumonia' were reported in December 2019 in the city of Wuhan, China (World Health Organisation, 2020a). The disease was later identified as caused by a zoonotic virus (Wang et al., 2020) which is known to spread via respiratory aerosol/droplets resulting from coughing and sneezing (Department of Health: South Africa, 2021). This infection is caused by SARS-CoV-2, a

pathogenic virus consisting of 16 non-structural and four structural proteins (Wang et al., 2020). The four structural proteins are the Envelope (E), Membrane (M), Nucleocapsid (N) and Spike (S) proteins (Boopathi et al., 2020).

The spike projections from the S proteins resemble a crown, hence the name of coronavirus (Beyerstedt et al., 2021). The S proteins allow the virus to attach to angiotensin-converting enzyme 2 (ACE2) which acts as a receptor, allowing access to the target host cells (Malinowska et al., 2021). The ACE2 protein is an enzyme present in human cells and tissues such as the heart, nose, lungs, and mouth which contributes to regulating inflammation, blood pressure and wound healing (Sriram et al., 2020). The SARS-CoV-2 virus inhibits the normal functioning of ACE2 which can ultimately lead to damaging organ tissue, especially in the lungs (Ni et al., 2020; Beyerstedt et al., 2021). In addition, research suggests that the higher the ACE2 level, the greater the likelihood of severe infection (Ni et al., 2020; Wang et al., 2020; Kragstrup, 2021; Rees, 2020).

The COVID-19 pandemic was declared on 11 March 2020 by the World Health Organisation (World Health Organisation, 2020b). Since 2019, variants of the SARS-CoV-2 virus have infected over 300 million people (January 2022) across the globe (World Health Organisation, 2021). The disease has left a devastating impact on both healthcare systems and economies (Kaye et al., 2021). Research has been devoted to finding a cure to this infection, including the potential use of *Cannabis* (Earlenbaugh, 2020; Esposito et al., 2020; Salles et al., 2020; Wang et al., 2020; Anil et al., 2021; Rees, 2020; Robertson, 2021).

Wang et al. (2020) developed over 800 *Cannabis* cultivars and identified 13 CBD extracts that were able to reduce ACE2 expression, which may in turn, reduce the severity of SARS-CoV-2 infection. In addition, several studies suggest that the anti-inflammatory properties of CBD might reduce the amount of pro-inflammatory cytokines released in response to this infection (Nagarkatti et al., 2009; Nichols & Kaplan, 2020). Cytokines are released as part of an immune response but a severe immune reaction may trigger the body to rapidly release large amounts of cytokines, which can be fatal (Cuffari, 2021). A cytokine storm, also known as acute respiratory syndrome, is one of the more severe symptoms associated with SARS-CoV-2 infection (Earlenbaugh, 2020).

Studies showing promise of CBD being able to reduce the severity of SARS-CoV-2 infection are still relatively new and will need further validation (Brown, 2020; Earlenbaugh, 2020; Rees, 2020). Nonetheless, products containing CBD are now available for sale in commercial South African outlets that target aspects of SARS-CoV-2 infection. Thus, outlets such as Clicks (Clicks, 2021) and Dischem (Dischem, 2021a) offer CBD oil that acts as an anti-inflammatory to counter the cytokine storm. In addition, CBD oil is offered to reduce stress (Clicks, 2021) that indirectly assists in maintaining the patient's immune system (Dischem, 2021b). While we await the results of clinical trials relating to the efficacy of such products, it is relevant and important for the present study that consumers are sensitised

to the benefits of CBD and this may have a knock-on effect in further increasing their acceptance of *Cannabis* products in food snacks.

2.7 DEFINITION OF A SNACK, ITS CONTRIBUTION TO HEALTH, *CANNABIS* AS A COMPONENT IN SNACKS AND CONCERNS RELATED TO *CANNABIS*

It is difficult to define snacking since there is no clear distinction between a mealtime and snacking (Mattes, 2018). Earlier literature suggests that the definition of a "meal" and "snack" is described by timing and size, but again, this is mainly based on loose cultural and/or social norms (Gatenby, 1997). Some authors are even hesitant to define a snack due to ambiguity in responses from study participants (Chamontin et al., 2003). Thus, different published definitions would identify snacking according to its consumption purpose so that Chaplin and Smith (2011) claimed that consumption of snacks is not triggered by hunger while Hess et al. (2016) argued that hunger, amongst other reasons, can be a reason for snacking. Other reasons for snacking include hedonism, distraction as well as social motivation (Hess et al., 2016).

Other authors define snacking as an occasion. However, although not a physiological definition, historically or sociologically, one would refer to a "meal" as breakfast, lunch or dinner while a "snack" as eating between meals (Chapelot, 2011). Furthermore, without any empirical or theoretical foundation of confirmed maximum energy intake per snack, associating snacks with an occasion can be quite subjective (Summerbell et al., 1995). For the purpose of this study, the word "snack" will be referred to as a helping of food eaten outside of traditional mealtimes (breakfast, lunch or dinner) which is eaten for the purpose of satisfying hunger.

2.7.1 Contribution of snacking to health

Snacking has been mainly linked with contributing towards obesity and weight gain (Marmonier et al., 2002; Hartmann et al., 2012; Hess et al., 2016; Mattes, 2018; Ciurzyńska et al., 2019). Yet other studies suggest that there is no direct association between obesity and frequency of eating (Rodríguez & Moreno, 2005; Chapelot, 2011) but rather to the nutritional quality of snacks (Mills et al., 2011). Conventional snacks would usually consist of high amounts of added sugar, sodium and fats with low nutritional value (Njike et al., 2016). In South Africa, for instance, much of the population has moved away from traditional foods to a diet consisting of convenience and, subsequently, processed foods (Reddy, 2017). Consequently, more than half of South Africans are now considered as being overweight (Mchiza et al., 2019) with South Africa having the highest rate of obesity in sub-Saharan Africa (Arthur, 2018).

The South African Government has, therefore, introduced new legislation to promote the reduction of sugar and sodium intake as a step towards improving the overall health of the population. Revised governmental legislation came into effect in 2016 that targeted the reduction of sodium in commonly consumed food items such as potato crisps and other savoury snacks (Government Gazette, 2016). The

effects of this legislation were mostly viewed as successful (Webster et al., 2017) but Charlton et al. (2018) found that the new sodium legislation resulted in a decreased iodine consumption amongst the population. Note that South Africa implemented mandatory salt iodisation in 1995 in order to reduce iodine deficiency (Jooste, 2013).

Secondly, the sugar tax on beverages was implemented in 2018 with an addition of approximately 2.1 cents for every gram of sugar exceeding 4 g per 100 ml (Arthur, 2018). In parallel with the sodium legislation, some viewed the regulating of sugar as positive (Arthur, 2018) whereas some were of the opinion that a sugar tax on snacks would be more effective (BusinessTech, 2020). In the ever-changing, fast pace of life, snack foods have increased in popularity amongst consumers, as there is usually no need for food preparation (Ciurzyńska et al., 2019). Globally, the majority of consumers consider snack foods as an intentional purchase with 79% of consumers eating snacks at home and 68% of consumers eating snacks with friends and family (Mielmann & Brunner, 2018). More recently, there has been a shift in consumer behaviour, which is more focused on health and, thus, there is an increasing demand for non-sugary snacks (Nielsen, 2014). Four out of 10 consumers want snacks with less sugar that are low in fat, for which they are willing to pay a premium (Nielsen, 2018). It is apparent that snack foods are often synonymous with unhealthy eating and should, therefore, be aimed at promoting a healthy lifestyle. The next section will discuss the inclusion of hemp products in snacks.

2.7.2 Inclusion of *Cannabis* in snacks

Consumers are moving towards a diet consisting of plant-based sources and are showing an increase in demand for proteins such as hemp seed protein (Eagle, 2020). Some studies have shown that the inclusion of hemp seed meal, for instance, enhanced the nutritional properties of dough (Pojić et al., 2015), gluten-free bread (Korus et al., 2017) and crackers (Radočaj et al., 2014). In addition, the inclusion of hemp flour has contributed to the palatability and colour of the final product (Korus et al., 2017). As mentioned, hemp seeds are a good source of fibre, protein and polyunsaturated fats and contain most of the essential amino acids as well as health-promoting functional, bioactive ingredients including flavonoids, beta-sitosterol and campsterol. Furthermore, 50 g of hemp seeds contain more than 50% of the nutrient reference values (NRVs) of vitamin B1 (thiamine), copper and phosphorus, and are sources of vitamin B3 (niacin), vitamin B6, iron and zinc (Government Gazette, 2014; U.S. Department of Agriculture, 2015).

Even though not FDA approved (American Veterinary Medical Association, 2021), some CBD products are available in assisting with digestive issues, anxiety, aggression and appetite in pets, specifically cats and dogs (Cannabuddy, 2021; CBD Store, 2021). Although cannabidiol has proven to have numerous positive contributions to health, only one CBD product has been approved by the FDA for human consumption (Epidiolex®) and claiming CBD as a dietary supplement is currently illegal in the United States (U.S. Food and Drug administration, 2020b). Yet, many snacks that have been infused

with CBD (also known as edibles) are appearing on the market and include jelly sweets (Taste of Cannabis, 2022), carbonated drinks (Recess, 2020) and snack bars (Livity Foods, 2020; Velobar, 2020). The names of these products often hint at the therapeutic effects that CBD is claimed to provide, such as "Chillax", "Relax" and "Recess" and can be seen in Figure 2.8. Interesting edibles infused with CBD currently on the South African market include candyfloss (Cannabliss, 2022), salted caramel (Cannabis Connect, 2021), chocolate and even hot beverages like espresso and hot chocolate (Zootly, 2019).

FIGURE 2.8: EDIBLES AVAILABLE ON THE MARKET, TASTE OF *CANNABIS* (2022) SELLS CHILLAX GUMMIES (A) AND RELAX GUMMY BEARS (B) AND RECESS BEVERAGES (C) ARE SOLD BY RECESS (2020).

Smoking *Cannabis* often causes breathing problems as inhaling smoke could irritate the lungs (National Institute on Drug Abuse, 2019) and ingesting *Cannabis* would therefore avoid the side effects of smoking *Cannabis* (Borodovsky et al., 2016). However, consuming edibles may cause other pharmacokinetic effects as opposed to inhaling *Cannabis* (Barrus et al., 2016). *Cannabis* smoke is absorbed in the lungs directly into the bloodstream and travels to the brain within several minutes (Ellis, 2017). Alternatively, ingested *Cannabis* need to be metabolised first and is only absorbed in the intestines which, depending on other factors such as previous meals (Ogletree, 2020), metabolism (Borodovsky et al., 2016), body weight, as well as the concentration and type of *Cannabis* or *Cannabis* product (Ferguson, 2019; Weil, 2021), can take up to several hours to affect the brain (Grewal & Loh, 2020; Ogletree, 2020). Edibles, therefore, have a higher likelihood of causing an overdose as the user is often impatient and would consume another dose before feeling the effects of the first dose (Barrus et al., 2016; Ellis, 2017; Grewal & Loh, 2020; Zipursky et al., 2020). While THC is more commonly associated with the abovementioned side effects, CBD, taken in high doses more than 1,500 mg may also have other side effects (Robertson, 2021). The next section will elaborate on other possible side effects and concerns that are related to fibre-type *Cannabis*.

2.8 POSSIBLE SIDE EFFECTS AND CONCERNS RELATED TO FIBRE-TYPE *CANNABIS*

Currently, CBD and CBD-products for private use are increasing in popularity amongst consumers in Europe (Hudock, 2019), South Africa (Wesgro, 2019) as well as Canada and America (Kearney, 2018). However, several concerns have surfaced regarding these products. At least one case study has reported acute intoxication from CBD (Bass & Linz, 2020) with gastrointestinal distress reported as the most common symptom (Lachenmeier & Walch, 2020). In addition, there are reports of CBD having the potential to cause liver damage and slow down brain activity (U.S. Food and Drug administration, 2020c). There is also little known about the chronic effects regarding CBD (Iffland & Grotenhermen, 2017) and Pal Pacher, an investigator at the National Institutes of Health, stated that: "Consumers are participating in one of the largest uncontrolled clinical trials in history, and no one really knows what it is they're taking" (Freedman, 2019).

Currently, due to uncertainty about risks, only one CBD product has been approved by the FDA (U.S. Food and Drug administration, 2020b). Thus, CBD has also not yet been classified as a food supplement or as a medical drug. "Medicinal drugs are considered unsafe until proven safe, whereas food supplements are considered safe until proven otherwise" (Hazekamp, 2018). Currently, limited research has been conducted on the hormonal effects of CBD and interactions with other drugs (Iffland & Grotenhermen, 2017). Robertson (2021) mentions that CBD interacts with the same drugs as grapefruit, so when using CBD, it is suggested to not use drugs with a grapefruit warning.

Furthermore, with the novelty of CBD, there has not yet been a validated method to assess and verify the purity and CBD content (Lachenmeier & Walch, 2020) and so claims on CBD products are currently unregulated and unverified (Ash, 2019). Herbst and Musgrave (2020) reported that, following an accidental CBD overdose in a paediatric patient, physicians found a substantial amount of THC in the patient's blood. Yet the CBD product in question was verified to contain only trace amounts of THC by both the U.S. Food and Drug administration as well as the manufacturer. Furthermore, before *Cannabis* was regulated in Canada, a marijuana sample purchased from a Toronto dispensary was found to contain high levels of yeast, mould and *Citrobacter freundii*, a pathogen that could worsen the health of the user (Robertson & McArthur, 2016).

There is also concern that either intentional or accidental adulteration or contamination of CBD products might be harmful to the consumer. A common risk is heavy metal and pesticide contamination (Busse et al., 2008) and toxic residual solvents used during the extraction of CBD (Romano & Hazekamp, 2013). In addition, there is the possibility of contamination of CBD by THC (Hazekamp, 2018; Lachenmeier & Walch, 2020) or synthetic cannabinoids which may have serious side effects (Scutti, 2016; Centers for Disease Control and Prevention, 2018).

Finally, there are knowledge gaps amongst *Cannabis* consumers, most of whom use guesswork to dose CBD (Wheeler et al., 2020; Giandelone & Luce, 2019). The U.S. Food and Drug administration (2019a) also raised concerns that consumers will use CBD to treat their ailments instead of knowing when to seek medical help from professionals. Likewise, Philpot et al. (2019) reported knowledge gaps amongst medical practitioners and considering the aforementioned possibility of side effects, this may place patients as well as medical practitioners who prescribe CBD at risk. With these concerns, it is evident that *Cannabis* labelling and legislation will need to improve (Lachenmeier & Walch, 2020). The following section will elaborate on *Cannabis* legislation in South Africa.

2.9 OVERVIEW OF *CANNABIS* LEGISLATION

Over the last few decades, *Cannabis* cultivation, possession and consumption has been prohibited globally due to its association with the intoxicating effects of THC (Montserrat-de la Paz et al., 2014; Johnson, 2018; Mierliţă, 2019) with South Africa being no different. In South Africa, the cultivation of all *Cannabis* varietals was banned in 1891 and 1903 by the governors of the Cape and the Orange Free State, respectively, based on the belief that the consumption of *Cannabis* led to increased criminal activity (Paterson, 2009). On May 31, 1910, the Union of South Africa formed from the joining of the four colonies (Natal, Cape, Orange River and Transvaal), governed under the British monarchy (Leacock, 1910). *Cannabis* cultivation, distribution and consumption was ultimately banned in all four provinces in June 1922 under the Customs and Excise Duties Amendment Act (Paterson, 2009). In addition, the Abuse of Dependence-producing Substances and Rehabilitation Centres Act of 1971 and the Drugs and Drug Trafficking Act of 1992 were passed to strengthen the prohibition of *Cannabis* (GrowerIQ, 2020).

The prohibition of *Cannabis* did have its disadvantages. Firstly, profiting from illegal trade of *Cannabis* is attractive to criminals (Mabe, 2012) and consequently, there is no requirement for verification or validation of the illegal product (Ash, 2019; Lachenmeier & Walch, 2020). This could also increase the likelihood of adulteration of a *Cannabis* product to increase profits, making the end-product dangerous to the user (Scutti, 2016; Centers for Disease Control and Prevention, 2018). In addition, evidence suggests that legalisation of *Cannabis* had shown promise in reducing criminal activities and drug-related issues in certain countries such as the United States, Uruguay and Portugal (Rolles et al., 2015; Ferreira, 2017). Secondly, arrests from *Cannabis*-related offenses are an easy method to increase the number of arrests made by law enforcement, to give the impression of better annual performance (Edwards et al., 2020). In South Africa in 2015/2016, one sixth of arrests were related to drugs (Kriegler, 2017) and this was the biggest arrest category in 2018 which cost up to R3.5 billion in police resources (Hopkins, 2018).

In 2010, Julian Stobbs and Myrtle Clarke (also known as “The dagga couple”) were imprisoned for the possession of marijuana and started a movement to legalise *Cannabis* by challenging the Constitutional

Court of South Africa (de Villiers, 2017). *Cannabis* was decriminalised in September 2018 (de Villiers, 2018b), due to a unanimous agreement that the prohibition thereof violated South Africans' right to privacy (Nel, 2018). Some distinction should be made between decriminalisation and legalisation. Decriminalisation of *Cannabis* would typically allow the use and possession of small amounts of the plant for private use, but still prohibits commercial sale and distribution thereof (Kowalski, 2016). On the other hand, legalisation of a substance permits the regulated consumption, sale, distribution and production of a substance and failing to comply with regulations would result in penalties or prosecution (Alcohol and Drug Foundation, 2021).

Up until August 2020, the decriminalisation relating to *Cannabis* was unclear with grey areas expected to become more defined over time (BusinessTech, 2019). The *Cannabis* for Private Purposes Bill was passed on 7 August 2020 (Vayej, 2020). This Bill provides clarity in terms of transgressions and their penalties relating to *Cannabis* as well as the legal limits of *Cannabis* that may be used in private places (Nkanjeni, 2020). Since *Cannabis* has not been fully legalised, the commercial distribution or exchange with remuneration remains prohibited (BusinessTech, 2021a). South African legislation also has strict regulations involving children and offenses may result in up to 15 years' imprisonment (Government Gazette, 2020). Some forms of CBD were also lowered from Schedule 7 to Schedule 4 or entirely excluded from the Schedule (Unscheduled or Schedule 0) (Schmidt, 2020). Unscheduled preparations should, however, adhere to one of the following conditions (Government Gazette, 2020): either a sales pack may make general, low-risk health maintenance or health enhancement claims and should contain less than 600 mg CBD with the daily dose not exceeding 20 mg of CBD or the product intended for ingestion may consist of raw *Cannabis* and contain naturally occurring cannabinoids with no more than 0.001% THC and 0.0075% CBD, respectively.

In addition, since hemp is classified under the *Cannabis* species, the cultivation thereof without a permit is still illegal in South Africa (Agricultural Research Council, 2014). Currently, a permit is issued for medicinal research purposes and only allows for cultivation of two hectares of *Cannabis* (Venter, 2020) and seeds should contain less than 0.1% THC (Louw, 2021). However, the recent issuing from the Department of Agriculture, Land Reform and Rural Development of the Draft National *Cannabis* Master Plan is set to change both drug-type and fibre-type *Cannabis* cultivation within South Africa (Ramalepe, 2021). The Master Plan is aimed at boosting the country's economy by increasing the *Cannabis* production for export purposes and to gain investment for research within the industry (BusinessTech, 2021a). It is, therefore, appropriate and necessary to explore how consumers will react to *Cannabis* finished products including food products fortified with *Cannabis*.

2.10 CONCLUSION

This section investigated some of the uses of fibre-type *Cannabis*, including its source as a food for humans, its chemical and nutritional composition as well as the health-promoting compounds within

the various components. It also focussed on the legislation of *Cannabis* in South Africa and how the changes in the law affect the consumption thereof. This section also explored the definition of snacking and how *Cannabis* can be incorporated in snacks. Finally, this section mentioned opportunities available on the market and basing such products on consumer knowledge, attitudes and perception/practice regarding *Cannabis* and *Cannabis*-infused snack foods would ensure product success. The following section describes the analytical tool used to explore South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snack foods.

CHAPTER 3 – CONCEPTUAL FRAMEWORK

This chapter aims to provide an insight into the knowledge-attitude-perception/practice model that will be used to explore South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snack foods.

3.1 INTRODUCTION

Chapter 2 discussed the key differences between fibre-type *Cannabis* and drug-type *Cannabis* with specific focus on fibre-type *Cannabis.* In addition, the legislative aspects, the history of *Cannabis*, its uses, specifically as a food source, were also discussed. Chapter 2 also reviewed the advantages and disadvantages relating to fibre-type *Cannabis* particulary as, even though evidence shows that there are benefits to consuming fibre-type *Cannabis* and its products, the implications of using *Cannabis* are still largely unknown and should not be disregarded.

Up until recently, as discussed in Chapter 2, public attitudes have mostly been negative toward *Cannabis* due to it being thought of as dangerous and related to criminal wrongdoing (Burke & Marx, 1971; Luginbuhl, 2001; Fetherston et al., 2005; Paterson, 2009). Since the publication of legislation of *Cannabis* for private use in September 2018 (de Villiers, 2018), consumer attitudes have changed (Shoup, 2018) with more consumers now willing to try food products infused with *Cannabis* (Kearney, 2018). In addition, South African consumers now have more access to *Cannabis* products and Wesgro (2019) predicts that the *Cannabis* market is expected to grow annually by 20% for the next 10 years. Some consumers, however, are still reluctant to try *Cannabis* due to their uncertainty regarding efficacy and safety of such an unregulated product (Cowling, 2020).

Cannabis and products infused with *Cannabis*, specifically CBD, are mostly unregulated (Ash, 2019) with little known on chronic effects (Iffland & Grotenhermen, 2017). In addition, recent studies regarding consumer knowledge-attitude-perception/practice (KAP) towards *Cannabis* have mainly been conducted in the United States and indicated that there are considerable knowledge gaps relating to *Cannabis* use amongst consumers (Kearney, 2018; Giandelone & Luce, 2019; Hudock, 2019). When referring to fibre-type *Cannabis*, specifically CBD, it is a novel product, with some consumers still believing that it produces psycho-activity (Hudock, 2019). Moreover, a recent study showed that of the majority of respondents who did use *Cannabis*, had only done so for fewer than five years (Giandelone & Luce, 2019). The KAP model was, therefore, applied in the current research study.

Chapter 3 explores some recent studies that implemented the KAP model to explore these elements and how they link together within the KAP model. A conceptual framework is proposed, discussing ‘knowledge’, ‘attitude’ and ‘perception/practice’ as individual elements as well as interrelated elements. The next section provides background as to the KAP model.

3.2 BACKGROUND TO THE KNOWLEDGE, ATTITUDE AND PERCEPTION/PRACTICE MODEL

The knowledge (K), attitude (A) and perception/practice (P) (KAP) model is used to acquire insight into what a specific population comprehends, believes and does in relation to a certain subject (World Health Organisation, 2008; Rav-Marathe et al., 2016; Siltrakool, 2017). Perception/practice can also be referred to as "behaviour" (Kaliyaperumal, 2004), which is often seen as the main variable to be predicted in behaviour-change research studies (Valente et al., 1998). The KAP model, also known as the KAB model (knowledge-attitude-behaviour) (Xu et al., 2010), aims to measure the knowledge that a population possesses on a certain topic, their attitude towards it and their behaviour concerning the topic (Kaliyaperumal, 2004).

The KAP model originated in the 1950's in the field of population studies to determine family planning (Launiala, 2009). It has since been used in different fields to explore human behaviour in various disciplines such as nutritional education (Schwartz, 1976; Baranowski et al., 2003; Bano et al., 2013; Kupolati, 2016), human health studies (Jadoo et al., 2020; Adam et al., 2021; Duong et al., 2021; Hossain et al., 2021; Hu et al., 2021; Janakiraman et al., 2021; Khan et al., 2021), environmental studies (Zheng et al., 2018; Domínguez-Valerio et al., 2019) and food safety (Dong, 2015; Azanaw et al., 2021). As such, it is a popular method for health interventions, especially in developing countries such as Ethiopia (Azanaw et al., 2021; Gebeyehu et al., 2021; Janakiraman et al., 2021), Libya (Jadoo et al., 2020), Sudan (Adam et al., 2021), Pakistan (Khan et al., 2021) and Vietnam (Duong et al., 2021) in which the knowledge and attitude concerning a specific disease is determined and how it influences perception/practice (Launiala, 2009).

The KAP model involves a simple design that is quick to implement, with data that are quantifiable and easy to interpret (Stone & Campbell, 1984). When using the KAP model in survey research, surveys are fairly cost-effective even when focusing on a large sample (Launiala, 2009). The KAP model does however have some limitations, especially when attempting to accurately measure knowledge, attitudes and perception/practice (Pelto & Pelto, 1997). A lack of contextual understanding between researcher and participant, for instance, may lead to incorrect interpretation and, consequently, incorrect measurement of data (Launiala, 2009). Furthermore, Cleland (1973) is of the opinion that caution should be taken with questions that respondents have not considered prior to partaking in the particular survey as this can increase the risk of falsely assuming attitudes. Therefore, when a participant is asked about their attitude toward CBD for instance, and they do not know what it is, their answer cannot be used for the study, especially with close-ended questions. Several studies have successfully implemented the KAP model and Table 3.1 discusses some recent studies picked on Google Scholar using the keywords "consumer", "KAP'' and "*Cannabis*".

TABLE 3.1: RECENT STUDIES IMPLEMENTING THE KAP-MODEL

Article	Description and findings
Knowledge, attitude, and practice towards COVID-19 among Libyan people – a web-based cross-sectional study (Jadoo et al., 2020)	KAP was successfully implemented regarding COVID-19 amongst Libyan people who showed a suitable amount of knowledge, good attitudes and sufficient practice amongst the 287 participants. In addition, the KAP was generally higher amongst women compared to men living in urban areas and education also affected the KAP.
Dietary knowledge, attitude and practice among type 2 diabetes mellitus patients in Sudan: a hospital-based cross-sectional study (Adam et al., 2021)	The study used 238 type 2 diabetes mellitus patients chosen at random from a local hospital. The study found that patients who received formal education were more likely to have better knowledge regarding diabetic dietary requirements. In addition, better knowledge and attitudes towards diabetic dietary requirements resulted in better practice, regardless of their socio-demographic status.
Food safety knowledge, attitude, and practice of college students, Ethiopia, 2019: A cross-sectional study (Azanaw et al., 2021)	The study aimed to investigate the knowledge, attitude and practices amongst college students in northwest Ethiopia. The findings from this study showed that, overall, knowledge, attitudes and practice amongst participants were low. Knowledge amongst participants was influenced by their gender, age and food safety education. In addition, attitudes toward food safety were not affected by knowledge but practice was influenced by demographics (age and gender) as well as overall food safety education. It was evident that there was a correlation between food safety knowledge and food safety practice, irrespective of participant attitudes.
A cross-sectional study of knowledge, attitude, and practice towards face mask use amid the COVID-19 pandemic amongst university students in Vietnam (Duong et al., 2021)	The study explored the KAP amongst university students in Vietnam towards their use of face masks and the reuse of cloth masks. The majority of participants showed favourable amounts of knowledge with positive attitudes and good practice regarding the use of face masks. A small percentage of the study population did not wash their cloth masks daily and the authors felt that there is a need to educate the community regarding reusable face masks. Furthermore, COVID-19 knowledge seemed to have an effect on face mask use, knowledge, attitudes and practice. In addition, face mask use practice was further influenced by gender, geographical distribution and academic majors, in that order.
Knowledge, attitude and practice of animal producers towards antimicrobial use and antimicrobial resistance in Oromia zone, north-eastern Ethiopia (Gebeyehu et al., 2021)	The study was done in order to explore KAP amongst animal producers regarding antimicrobial use (AMU) and antimicrobial resistance (AMR). The vast majority of animal producers showed a lack of knowledge, with negative attitudes and ultimately unfavourable practices towards AMU and AMR. In addition, education didn't have an effect on the animal producers' KAP, but males seemed to demonstrate better knowledge and practice regarding AMU and AMR.
Healthcare workers' knowledge, attitude, and practice regarding personal protective equipment for the prevention of COVID-19 (Hossain et al., 2021)	In this study, the researchers aimed to explore KAP amongst 393 healthcare workers on the subject of personal protective equipment (PPE). The majority of participants had good knowledge and attitude regarding PPE but only half had suitable practice regarding PPE. In addition, good practice regarding PPE was associated with non-physicians who worked at private hospitals, using office transport, with lower levels of education.
A nationwide post-marketing survey of knowledge, attitude	Findings from this study indicated a considerable number of knowledge gaps and lack of awareness amongst the population which was affected by factors

Article	Description and findings
and practice toward human papillomavirus vaccine in general population: Implications for vaccine roll-out in mainland China (Hu et al., 2021)	such as industry of employment and household income. Consequently, only 3% of females had been vaccinated within the first three years of HPV licensure in China. There was a willingness to get vaccinated and it was evident that there is a necessity for educational campaigns to accelerate the HPV vaccine roll-out in China.
Knowledge, attitude, and practice of antenatal exercises among pregnant women in Ethiopia: A cross-sectional study (Janakiraman et al., 2021)	The study explored the KAP of antenatal exercises (ANEx) amongst 349 pregnant Ethiopian women. Education had an effect on KAP and favourable knowledge resulted in positive practice and attitudes. Yet good practice was not related with positive attitudes. Overall, even though knowledge regarding ANEx amongst participants was low, the majority had favourable attitudes toward ANEx.
Knowledge, attitude, and practice on antibiotics and its resistance: A two-phase mixed-methods online study among Pakistani community pharmacists to promote rational antibiotic use (Khan et al., 2021)	The objective of the study was to explore the KAP amongst Pakistani community pharmacists (CPs) regarding antibiotics and antibiotic resistance (ABR) in an attempt to encourage sensible antibiotic use. The CPs displayed overall good knowledge regarding drug-resistant organisms but displayed a lack of knowledge with antibiotic groups with their respective ABR patterns. While the CPs had a positive attitude towards antibiotics, their practices were only slightly adequate. It was evident from this study that education and training amongst CP's was necessary in order to relay correct information to patients.
Knowledge, attitude, and practice on antibiotic use and antibiotic resistance among the veterinarians and para-veterinarians in Bhutan (Wangmo et al., 2021)	Another successful implementation of KAP was done amongst veterinarians regarding antibiotic use and antibiotic resistance. Overall, even though knowledge regarding antibiotic use and antibiotic resistance was poor, attitudes and practice were good and the authors identified the need for regular refresher courses/training in order to ensure the proper use of antibiotics.

The abovementioned studies confirm that the KAP model is capable of determining the relationship between knowledge, attitude and perception/practice. Interestingly, it is evident that in most cases, a lack of knowledge results in unfavourable attitudes and practice and vice versa. There were, however, some cases where knowledge was poor, but attitudes and practice were good. In addition, demographic information such as occupation, gender, geographic segmentation and education also had an effect on the participants' KAP. It has been suggested, for instance, that men (Secades-Villa & Fernández-Artámendi, 2017; Hemsing & Greaves, 2020; Bruce et al., 2021) working in the industries of food service, accommodation, entertainment, media and sport are more likely to use THC recreationally (Arps, 2018; Gander, 2019). Alternatively, female millennials are more likely to consume CBD for health reasons (Kustin, 2020; Government of Canada, 2021). The following sections will discuss the theoretical constructs of the knowledge-attitude-perception/practice model.

3.3 THEORETICAL CONSTRUCTS OF THE KAP MODEL

Different models of the knowledge-attitude-perception/practice triad exist. Both Akintunde (2017) and Iyer (2018) suggest a sequential path of knowledge that influences attitudes, which in turn influences perception/practice, suggesting a linear relationship between KAP, as can be seen in Figure 3.1.

FIGURE 3.1: LINEAR RELATIONSHIP OF KAP ADOPTED FROM AKINTUNDE (2017) AND IYER (2018).

Other authors have suggested that the relationship of KAP forms an interlinked triangle, which can be seen in Figure 3.2 (Bano et al., 2013; Siltrakool, 2017; Arumugam, 2019; Domínguez-Valerio et al., 2019; Zeng et al., 2019). The triangular relationship enables the possibility of interrelated variations within KAP. This suggests that as one element increases or changes, it has the possibility to affect the remaining two elements (Schwartz, 1976; Valente et al., 1998; Baranowski et al., 2003; Bano et al., 2013; Zheng et al., 2018). A change in perception/practice will, for instance, be motivated by the acquisition of knowledge and/or attitude (World Health Organisation, 2012).

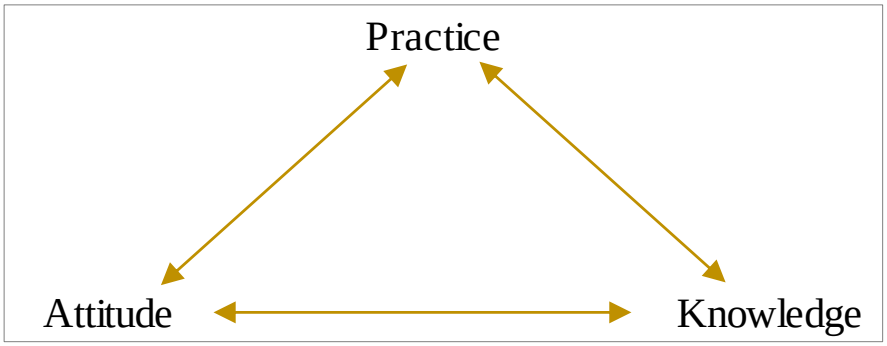

FIGURE 3.2: TRIANGULAR RELATIONSHIP OF KAP ADOPTED FROM BANO ET AL. (2013); SILTRAKOOL (2017); ARUMUGAM (2019); DOMÍNGUEZ-VALERIO ET AL. (2019) AND ZENG ET AL. (2019).

Valente et al. (1998) suggested that there are six possible sequences within KAP. Figure 3.3 illustrates the variations namely Learning (a-b), Affinity (c-d), Rational (d-e), Grudging acceptance (f-a), Dissonance (e-c) and Emotional (b-f).

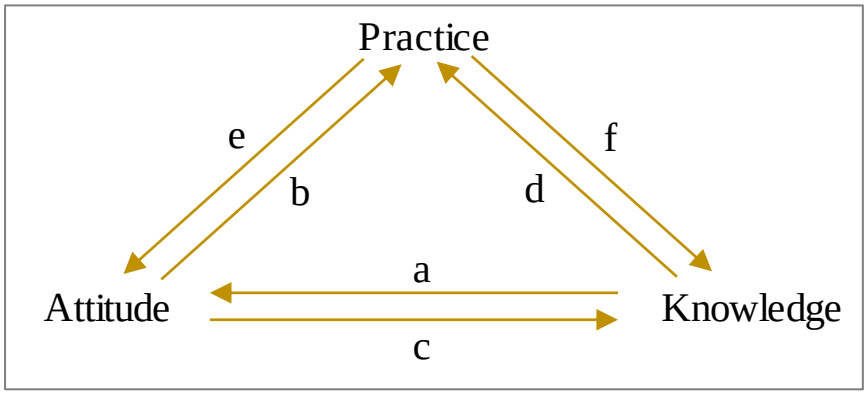

FIGURE 3.3: TRIAD OF KNOWLEDGE-ATTITUDE-PERCEPTION/PRACTICE MODEL AND THEIR RELATIONSHIPS ADOPTED FROM VALENTE ET AL. (1998).

The following literature sections will discuss the individual knowledge, attitude and perception/practice factors within the KAP model. The relationship between each element of this triad will also be discussed as well as possible variations thereof.

3.3.1 Knowledge

Consumers gain knowledge through collecting, filtering and adapting information in a manner that makes sense to them (Noel, 2009). It evolves and changes frequently as new information becomes available and with experience gained (Joubert, 2013). As an internal source of information, it is typically used at the start of any consumer purchase-decision (Stephens, 2017) and can, therefore, be classified under the information-seeking stage of the consumer decision-making process (Lombard-Roberts & Parumasur, 2017).

Brucks (1985) has divided consumer knowledge into three categories, namely subjective knowledge, objective knowledge and consumer experience. Subjective knowledge is the perceived knowledge of the consumer and how much they believe they know. Objective knowledge is the actual amount of knowledge a consumer possesses (Kolyesnikova et al., 2008) that can be determined through an impartial assessment (Brucks, 1985). Subjective knowledge is considered to be more likely to influence behaviour (Flynn & Goldsmith, 1999), whereas a degree of objective knowledge may instead motivate consumers to increase knowledge-search behaviour (Brucks, 1985).

Consumer experience is gained through consuming or using a product or service. Consumption experience provides the consumer with a fundamental level of consumer knowledge which is widespread and can either be a pleasant or unpleasant encounter (Clarkson et al., 2013). Consumption experience is considered to affect subjective knowledge of a consumer which is often a more accessible cue of knowledge than theoretical information (Park et al., 1994). This tends to give consumers more

confidence with the actual amount of knowledge they possess (Alba & Hutchinson, 2000). In addition, consumers with increased product experience are less likely to display knowledge-search behaviour (Moore & Lehmann, 1980). Marketers should, however, rather focus on the type of knowledge consumers possess, rather than the accuracy of their knowledge (Ajzen et al., 2011).

Earlier studies indicated that even though knowledge may influence behaviour, it is not always sufficient to motivate behaviour (Fisher & Fisher, 1992; Ajzen et al., 2011). Previous research focussed on how behaviour is guided or influenced mainly by attitude (Fazio et al., 1983), disregarding other factors that might have an effect on this relationship (Fazio, 1986). In addition, both the theory of reasoned action (Ajzen & Fishbein, 1980) and its successor, the theory of planned behaviour (Ajzen, 1985), suggest that factors such as attitude, intentions and subjective norms rather influence behaviour. Other authors, however, consider knowledge to also have an impact on the attitude-behaviour relationship (Macaulay et al., 2005; Borden et al., 2008). Research has shown that when a population has knowledge regarding a certain topic, it has a favourable impact on attitude and perception/practice (d-e or a-b paths on the triangular model) (Valente et al., 1998; Macaulay et al., 2005; Borden et al., 2008; Zheng et al., 2018; Zeiger et al., 2020).

Knowledge is interpreted at various levels. Individual concepts are decoded and grouped into a scheme that has a more complex meaning (Solomon et al., 2006). The sources from where knowledge is accumulated can be gained via education, experience, judgement, skill and a mixture of comprehension (Bano et al., 2013; Rav-Marathe et al., 2016). Valente et al. (1998) suggest the "learning" sequence, one of the possible sequences in the triangular model, occurs through knowledge that accumulates to influence attitude which in turn, motivates perception/practice, and therefore has a K-A-P sequence (a-b path). In addition, the "rational" sequence as suggested by Valente et al. (1998) proposes that knowledge may influence perception/practice irrespective of attitudes (K-P-A sequence or d-e path). The next section will focus on attitude within the KAP-model.

3.3.2 Attitude

Consumer attitude can be defined as the behaviour towards people, objects, subjects or situations (Solomon et al., 2006). It is often described as general and lasting, since it applies to more than one event and tends to endure over time (Solomon et al., 2006). Attitudes are often learnt and formed through experience and/or encounters (Eagly & Chaiken, 2007) and even though it is not necessarily permanent, it tends to be consistent (Lombard-Roberts & Parumasur, 2017). Existing attitudes are, furthermore, often difficult to change as attitudinal change happens gradually with consumers often resistant to change (Price, 2019). Therefore, marketers should consider aiming their communication to fit into existing attitudes rather than trying to change it (Kotler & Keller, 2012). For instance, consumers have become increasingly health-orientated (Nielsen, 2014) and fitting *Cannabis*-infused snacks into a health-promoting marketing strategy would increase the likelihood of consumer acceptance.

Some authors have mentioned attitude as consisting of only cognitive and affective components (Smith, 1947; Rosenburg, 1960). Yet, attitude has been known throughout history to consist of three components: cognitive, affective and conative (Breckler, 1984; Haddock & Maio, 2008; Noel, 2009; Lombard-Roberts & Parumasur, 2017). This is also known as the ABC-model (Solomon et al., 2006). Affective (A) refers to how consumers feel, conative (or behaviour, B) is what consumers do and cognitive (C) describes what consumers think. Attitude, therefore, reflects a consumer's feelings, thoughts and actions (Lombard-Roberts & Parumasur, 2017). Eagly and Chaiken (1993), however, argued that these components may be challenging to separate, especially when considering the point of attitudinal formation and response. These authors later added to this by stating that attitudes may be expressed or shaped through a predominant component or by means of a mixture of the components within the attitudinal tripartite model (Eagly & Chaiken, 2007). Attitudes are, thus, described as a unidimensional model which shifts primarily from positive to negative (Samra, 2014). This study will follow a unidimensional attitudinal structure.

Baranowski et al. (2003) suggested that attitude is influenced by the accumulation of knowledge, which in turn accumulates to influence behaviour or practice. Moreover, behaviour is motivated by a combination of what consumers feel and think (Joubert, 2013). This explains how the availability of information and accumulation of knowledge shapes attitudes (K-A-P sequence). An example of this is the recent change in South African legalisation relating to *Cannabis*, together with ethnic use and news and social media coverage which has sparked a shift in consumer attitudes to be more favourable toward *Cannabis* (Moeller & Woods, 2015; Martinez & Lewis, 2016; de Villiers, 2018).

Consumer attitude can be formed by means of classical or instrumental conditioning, cognitive learning, experience, external authorities or marketing communications (Roberts-Lombard & Parumasur, 2017). The cognitive learning theory supports the earlier statement from Valente et al. (1998) that knowledge accumulates to affect attitude. This theory suggests that an individual uses information from their surroundings to solve problems and master their environment (Solomon et al., 2006). Individuals would, therefore, search and obtain relevant information and subsequently form an attitude towards an object or idea (Roberts-Lombard & Parumasur, 2017). Attitudes can either be enthusiastic, positive, indifferent, negative, or hostile (Kotler & Keller, 2012). The following section will discuss perception/practice within the KAP model.

3.3.3 Perception/practice

Consumer perception can be defined as the process where consumers are exposed to information or stimuli which are selected, organised and interpreted to make sense of a situation, object or concept (Lombard-Roberts & Parumasur, 2017). Exposure refers to the contact between the consumer and the stimuli (Noel, 2009). This can either be through a physical (sight, smell, taste, touch, hear) or psychological channel (an association between the surrounding environment and circumstances)

(Kotler & Keller, 2012). Perception is formed through the consumer's frame of reference and past experiences which are often viewed as subjective (Lombard-Roberts & Parumasur, 2017). In the field of social science, perception is often associated with practice (Bargh et al., 1996; Dijksterhuis & van Knippenberg, 1998; Chartrand et al., 2005; Roussel & Frenay, 2019) and consumer perceptions are often viewed as being the key component in affecting practice (Kotler & Keller, 2012). Furthermore, practice and behaviour are synonyms within this study. A vast amount of research has been devoted to defining and assessing behaviour, concluding that the constitutive definition is the way in which a group or person reacts in, or towards, a situation or setting (Schrader & Lawless, 2004).

The relationship between perception and practice is expressed through other phenomena such as priming (Dijksterhuis & van Knippenberg, 1998) and/or stereotyping (Mortensen et al., 2020). Priming refers to an automated reaction (Krpan, 2017), which is activated through exposure of an object, concept or situation (Morgan et al., 2010). Consequently, stereotyping is known as a belief, idea or generalisation of a thing, person or group based on characteristics such as race, appearance, age, gender or ethnicity (Merriam-Webster's collegiate dictionary, 2021). The *Cannabis*-user stereotype, for instance, would include Rastafarians with dreadlocks, 'hippies', rebellious adolescents or party-goers (Mortensen et al., 2020). In addition, *Cannabis* has had a longstanding association with being responsible for an increase in criminal activities and being dangerous (Burke & Marx, 1971; Fetherston et al., 2005; Paterson, 2009; Luckett et al., 2016; Keyhani et al., 2018; Resko et al., 2019; Rampold & Telg, 2020). Consequently, a person would behave according to their perception of a person or group that may be triggered by a characteristic such as appearance (Dijksterhuis & van Knippenberg, 1998).

Hirst et al. (2017) furthermore suggest that the legalisation of *Cannabis* may influence consumers to perceive it as more acceptable as was evident in the United States (Cerdá et al., 2019; Roth, 2019). Subsequently, *Cannabis* usage across the globe has increased by 60% over the past decade (Roth, 2019). In addition, acquiring information through word-of-mouth has always been a powerful method of encouraging purchase behaviour (Kotler & Keller, 2012). This was evident in some findings where the majority of consumers initially heard of fibre-type *Cannabis* (CBD) through friends or family (Cowling, 2020; Giandelone & Luce, 2019). Consumers will, therefore, be more likely to use *Cannabis* products when recommended by a trusted source.

During consumer decision-making, there are indirect motivations that shape behaviour (Joubert, 2013). Behavioural change is thus described as progressive since it happens with a gradual increase of knowledge and attitude (Baranowski et al., 2003). The next section will discuss how the abovementioned elements will collaborate into a conceptual framework able to explore South African consumer knowledge, attitude and perception/practice of *Cannabis* and *Cannabis*-infused snack foods.

3.4 CONCEPTUAL FRAMEWORK

A conceptual framework can be defined as a narrative or graphical (Miles et al., 2014) outline of ideas or concepts that are interlinked (Jabareen, 2008). A conceptual framework aims to provide a basis for the study theory (Crawford, 2016) to ultimately set the objectives of the study (Gornik-Tomaszewski & Choi, 2018). The triangular, interrelated KAP model, adopted from Valente et al. (1998), will be used as a framework within this study and is illustrated in Figure 3.4. The constructs of KAP will be used to explore South African consumer knowledge, attitude and perception/practice of *Cannabis* and *Cannabis*-infused snack foods. Furthermore, KAP will be used to explore how the accumulation of one component affects the other two components within KAP.

The first element within KAP is **knowledge** (**K**). The type of *Cannabis*-related knowledge consumers possess will influence their attitude and subsequently their perception/practice. If, for instance, a consumer is aware of the calming benefits associated with *Cannabis*, they might have favourable attitudes toward *Cannabis* and be willing to consume it. This sequence (K-A-P) is defined as the "learning" model (Valente et al., 1998). The consumer would then gain knowledge on *Cannabis* and whether consuming *Cannabis* was able to provide the desired effect and the consumer's attitude and future behaviour will be influenced accordingly. Subjective and objective knowledge amongst consumers will, therefore, be important to determine since it may have an impact on their attitudes and perception/practice. In addition, comparing responses from *Cannabis*-users with non-*Cannabis*-users will provide insights into the effects of consumption experience (knowledge) on attitudes and perception/practice. Valente et al. (1998) also mentioned the possibility of the "rational"-model, where a consumer would consume a product due to the possibility of its benefits, disregarding their attitudes toward it (K-P-A or d-e path).

The second construct within KAP is **attitude** (**A**). As mentioned, attitudes are well-known to guide behaviour and a positive attitude will increase the likelihood of *Cannabis* consumption. In addition, a favourable attitude towards *Cannabis* might improve *Cannabis*-related knowledge (Zeiger et al., 2020). This sequence, according to Valente et al. (1998), is entitled the "affinity" model, where attitude would affect knowledge and ultimately behaviour (A-K-P or c-d path). This sequence is supported by findings by Martinez and Lewis (2016) where young adults that had favourable attitudes toward *Cannabis*, would seek out further information regarding the topic which, in turn, would affect their behaviour. This suggests that both attitude and knowledge are similarly important for predicting behaviour. Alternatively, consumers with a favourable attitude towards *Cannabis* might be more likely to consume *Cannabis* and then gain consumption knowledge - this is defined by Valente et al. (1998) as the "emotional"-model (A-P-K or b-f path).

The last component within KAP is **perception/practice** (**P**). As previously discussed, perceptions are associated with guiding practice. Hirst et al. (2017), for instance, suggested that the legalisation of

Cannabis in certain states had led to an increase in *Cannabis* use since consumers perceive it as more acceptable. In addition, the majority of consumers in some surveys initially heard of fibre-type *Cannabis* (CBD) through friends, family or dispensary associates (Cowling, 2020; Giandelone & Luce, 2019). *Cannabis* consumption (P) may provide the consumer with consumption experience, which will then increase consumer knowledge and, consequently, affect their attitudes. This P-K-A sequence, also known as "grudging acceptance" (f-a path on the triangular model) (Valente et al., 1998), is supported by findings from Moeller and Woods (2015). In this study, participants who had used *Cannabis* prior to the survey were more knowledgeable about *Cannabis*. Alternatively, a positive attitude may be formed through a good consumption experience where knowledge is gained last, known as "dissonance" (P-A-K or e-c path) (Valente et al., 1998). Kruger et al. (2020) suggest, however, that this sequence may stop with "attitude" as participants in the study who had used *Cannabis*, had a better attitude towards *Cannabis*, but lacked factual knowledge thereof.

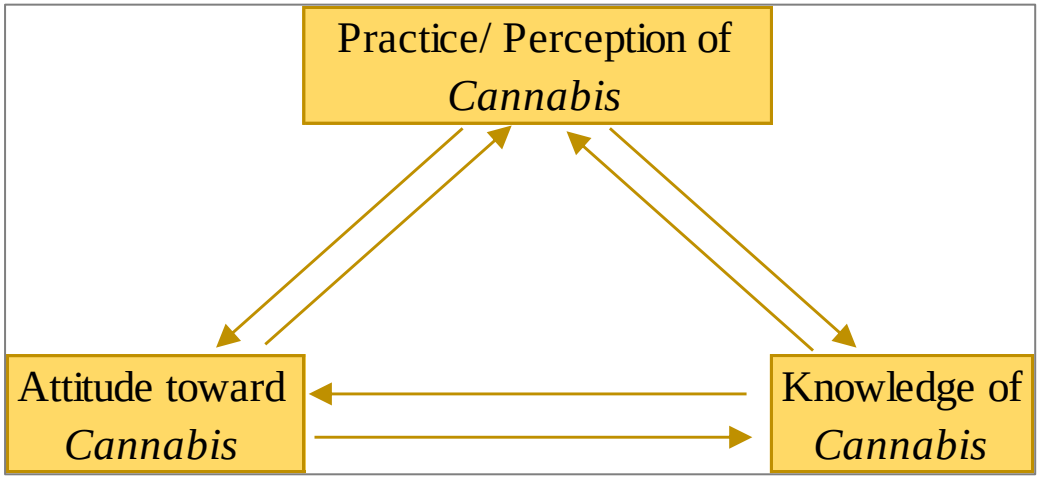

FIGURE 3.4: REPRESENTATION OF THE CONCEPTUAL FRAMEWORK OF THE TRIAD OF KNOWLEDGE-ATTITUDE-PERCEPTION/PRACTICE MODEL AND THEIR RELATIONSHIPS ADOPTED FROM VALENTE ET AL. (1998).

3.5 CONCLUSION

This chapter discussed the knowledge-attitude-perception/practice triangular model that allows for the components within the KAP model to be interrelated. In addition, recent studies that successfully implemented the KAP model were also discussed. Each of the components within the KAP model was also discussed and how the accumulation of one component could affect the remaining components with some examples provided. The conceptual framework of the current study was then proposed and how it would be applied in the current study. The next section discusses the research methodology applied in the current study.

CHAPTER 4 – RESEARCH METHODOLOGY

The previous chapters discussed an overview of *Cannabis* with specific focus on fibre-type *Cannabis*, also known as hemp. The researcher's understanding of the theoretical approach, its constituents and their relationships were presented in Chapter 3 to provide the study theory with a foundation (Crawford, 2016), outline the interlinked ideas/concepts (Jabareen, 2008) and set the objectives of the study (Gornik-Tomaszewski & Choi, 2018). The knowledge-attitude-perception/practice triad was adopted from Valente et al. (1998) for this study and each component was discussed individually as well as their interlinked relationships. The previous chapter also discussed some recent studies that adopted the KAP model and its ability to answer the specific research objectives. In addressing the research study objectives, Chapter 4 describes the methods used to explore the different components of the conceptual framework.

4.1 INTRODUCTION

Research can be referred to as an objective and systematic investigation or search for information intended to solve a problem on a particular topic (Booth et al., 2008) that is necessary for the advancement of mankind (Pandey & Pandey, 2015). Distinction should be made between research methods and research methodology. Research methodology aims to resolve a challenging situation by means of an organised structure whereas research methods refer to the techniques and tools used to conduct research (Marvasti, 2004; Mishra & Alok, 2011). The following sections will summarise the methodical processes that will be executed to explore South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snack foods.

The research aims and objectives used in this study to explore South African consumer knowledge, attitude and perception/practice (KAP) regarding *Cannabis* and *Cannabis*-infused snack foods is also discussed within this chapter. The research paradigm as well as the research design is then discussed followed by the research setting and sampling strategies used. Furthermore, the inclusion and exclusion criteria are also discussed. Finally, the data-gathering instruments, the process followed to analyse the data, the elements that ensured trustworthiness and the ethical aspects are also covered in this chapter.

4.2 RESEARCH AIM AND OBJECTIVES

The aim of this study was to explore the ***South African consumer knowledge, attitude and perception/practice (KAP) of Cannabis and Cannabis-infused snack foods***. This aim was achieved by addressing the following objectives:

Objective 1: To explore South African consumer's knowledge regarding fibre-type *Cannabis*.

1.1 In terms of their subjective knowledge

1.2 In terms of their objective knowledge

Objective 2: To explore South African consumers' attitude towards fibre-type *Cannabis*.

Objective 3: To explore South African consumers' perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods.

4.3 PROPOSED PARADIGM

A qualitative research design was adopted to explore the South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snack foods. Qualitative research is normally applied in the research field of social science (Bandyopadhyay, 2015) and is commonly used to describe a phenomenon or to gain comprehensive insight into the human experience (Brink et al., 2018). It is therefore explorative (Walliman, 2011) or descriptive in nature with a focus on the relationship between multiple topics (Mishra & Alok, 2011). Qualitative research aims to identify emerging data and inherent patterns (Bryman et al., 2014) and so was suited to gain insight into *Cannabis* and the novel inclusion of *Cannabis* into food products.

A qualitative inquiry was the best manner to address the stated research aims and objectives, which focused on consumer attitudes, knowledge and perception/practice towards *Cannabis* and snack foods that contain *Cannabis*. Qualitative research focuses on studying social and behavioural phenomena from the perspective of the interacting individuals and aims to provide a deeper understanding thereof in the natural setting or context in which it occurs and is experienced (Snape & Spencer, 2003). Qualitative techniques are useful in understanding complex subjects (Gajjar et al., 2017) and is most effective when the researcher allows the participants to contribute without restraint with multiple viewpoints being investigated (Brink et al., 2018). This may however cause qualitative research to be challenging to analyse (Mishra & Alok, 2011) and difficult to replicate (Bryman et al., 2014). Yet, qualitative research is useful in determining a richer and more valuable understanding of consumer styles of decision-making and their behaviour (Walliman, 2011; Bandyopadhyay, 2015). Thus, qualitative research is particularly useful in KAP studies (Andrien, 1994).

Firstly, the researcher is able to include more ideas during data collection, giving a qualitative approach more flexibility (Kumar, 2011). Therefore, the researcher is able to ensure relevancy of questions as well as be able to recognize possible bias from participants (Bukachi et al., 2018). Secondly, qualitative research is iterative and data collection methods may be modified which may lead the researcher to discover unanticipated findings (Hudelson, 1994). A qualitative inquiry would therefore assist to answer the 'how' and 'why' of consumer knowledge-attitude-perception/practice (Macías & Glassauer, 2014) and so the researcher was able to gain insights into factors that affected or shaped consumer knowledge, attitudes and perception/practice regarding *Cannabis* and *Cannabis*-infused snack foods.

The following section discusses the research design adapted for the current research study.

4.4 RESEARCH DESIGN

This study adopted an exploratory research design. As the name suggests, it is used to explore or discover and gain insight into a problem or phenomenon (Kothari, 2004). Exploratory KAP research may also be referred to as a baseline study which, as with explorative research, seeks to provide a basis of understanding regarding a research question (Goutille, 2009). As previously mentioned, the South African government only recently sanctioned the private use of *Cannabis* (de Villiers, 2018b) with the *Cannabis* Master Plan underway (Ramalepe, 2021), aimed at advancing the economy and gaining investment in the agriculture, supply and processing of *Cannabis* (BusinessTech, 2021b). Academics and scientists are, however, still restricted to effectively research *Cannabis* within social, medical, economic and agricultural sectors in South Africa (Steynvaart, 2020). An explorative research design is therefore appropriate since it is intended to gain an in-depth understanding on participants that have limited existing information or data (Kalof et al., 2008; Memon et al., 2015), rather than testing a theory (Vogt et al., 2012).

The effects of decriminalisation or legalisation of drugs such as *Cannabis* have, furthermore, been largely debated. It has been suggested that this process has removed the "forbidden fruit" effect and so has led to a decrease in *Cannabis* use (Drug Policy Alliance, 2012). Indeed, evidence suggests that legalisation of drugs such as *Cannabis* shows promise in reducing criminal activities and drug-related issues (Ferreira, 2017; Rolles et al., 2015). However, other authors suggest that decriminalisation or legalisation of *Cannabis* may lead to consumers perceiving it as being more acceptable (Hirst et al., 2017; Roth, 2019; Cerdá et al., 2020), consequently leading to increased use of *Cannabis* and *Cannabis*-infused products. For instance, the legalisation of *Cannabis* in regions such as Colorado and Amsterdam has attracted the attention of many tourists (Kang et al., 2016; Kuper, 2018). From a medical perspective, medical practitioners living in Colorado showed more favourable attitudes towards medical *Cannabis* (Chan et al., 2017) and patients were more likely to self-administer medical *Cannabis* when living in a region that has legalised *Cannabis* (Belyea et al., 2016).

Hence, exploratory research was employed in the current research study as it is especially useful in identifying new opportunities, possible problems and can give background or perspectives that may catalyse further research on the topic (Lappin et al., 1994). By applying an exploratory research design, the researcher was able to explore South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snack foods. The data gathered from this study might support further research in the field of *Cannabis* and contribute to future studies aimed at consumer behaviour towards novel and unique food products. The following section discusses the research setting of the current study.

4.5 RESEARCH SETTING

At the end of 2019, several cases of 'viral pneumonia' were reported in Wuhan, China and the resulting epidemic was later identified as COVID-19 (World Health Organisation, 2020a). This highly infectious disease has since spread via respiratory inhalation of droplets containing the virus to residents in over 100 countries across the world (Department of Health: South Africa, 2021). One method of controlling the spread of the virus is by implementing social distancing (Centers for Disease Control and Prevention, 2021). Consequently, various software platforms were created to hold meetings and interviews remotely to prevent physical interaction between meeting participants (Molla, 2020). One limitation of these platforms is that, as with telephonic interviews that have been similarly used in the past (Babbie, 2008), accessing Microsoft Teams© is limited to participants associated with a higher socio-economic profile and may result in class bias (Babbie, 2008). Although this method of communication is seen as a cost-effective approach, its use by the researcher limits access to non-verbal cues such as facial expression and body language of the participants (Ryan et al., 2009). In addition, these platforms can be interactive with visual presentations and can digitally record the proceedings (Microsoft, 2021). The participants were, therefore, interviewed remotely on one of the video platforms, Microsoft Teams©. The following section will discuss the sampling strategy used to recruit participants for the study.

4.6 SAMPLE STRATEGY

Time and cost limitations restrict a researcher from including the entire population in a specific study (Maree & Pietersen, 2016a). The population can be referred to as the pool of universal units such as people, nations or regions that the researcher aims to study (Bryman et al., 2014). In practice, a smaller, more manageable sample is, therefore, obtained that represents a target population (Brink et al., 2018). Dawson (2002) suggests that when picking a sample for a qualitative study, the aim is not to generalise, but to rather gain an understanding into human behaviour.

Non-probability or non-random sampling techniques were used to determine the sample for this study. Researchers are often advised to refrain from the use of non-probability sampling due to possible bias, subsequently limiting the ability of the study to be generalised (Bryman et al., 2014). However, non-probability sampling is more cost-effective and less time-consuming (Maree & Pietersen, 2016a) and the purpose of this study was not to draw generalisations but rather to explore a subset of South African consumer knowledge, attitude and perception/practice of *Cannabis* and *Cannabis*-infused snack foods.

Firstly, this study used convenience sampling. Also known as accidental or haphazard sampling (Etikan et al., 2015), this non-probability sampling technique is based on the ease and convenience of the researcher (Walliman, 2011). The sample is therefore selected based on certain criteria such as willingness to participate, availability, accessibility or geographic proximity (Dörnyei, 2007). In addition, when the study topic is likely to be sensitive, convenience sampling may assist in putting

participants at ease (Gumucio et al., 2011). The researcher obtained samples by similtaniously advertising the study on social media (social media post visible to friends or connections on LinkedIn© and Facebook©) and by asking some colleagues to partake in the study. Any person who agreed to partake in the study and met the inclusion criteria was included in the study. Colleagues of the researcher who were willing to participate were recruited as samples in the study due to their availability and accessibility. The researcher gained permission from the relevant managers and set up a time with colleagues to participate via Microsoft Teams©. However, as some colleagues may have feared losing out on career advancements due to their opinion towards *Cannabis* (Hirst et al., 2017), they may not have answered truthfully. Therefore, supplemental sampling methods were also employed.

Secondly, snowball or referral sampling was used, where participants could identify other prospective participants to be included in the sample (Kumar, 2011). Snowball sampling has proven to be useful in discovering difficult to reach or 'hidden' populations (Atkinson & Flint, 2001). In addition, when the study topic is likely to be sensitive, snowball sampling is often considered to be a suitable sampling approach (Biernacki & Waldorf, 1981). Several studies have indicated that referral sampling is successful in studying drug users (Griffiths et al., 1993; Barendregt et al., 2005; Notley, 2005; Shewan & Dalgarno, 2005; McHale & Hunt, 2008; Vanhove et al., 2012) as it assists with making the study population more comfortable when answering sensitive questions (Hendriks et al., 1992). Thus, during their interview, the researcher may ask participants to identify some of their peers to take part in the study.

The third non-probability sampling method used was purposive sampling. Even though purposive sampling has a risk of researcher bias (Sharma, 2017), it allows the researcher to target specific participants to be included in the study (Tongco, 2007). If successfully implemented, the researcher can strategically include specific participants to address the research objectives of the study (Palys, 2008). In the present study, the researcher specifically asked people who consumed *Cannabis* and who did not consume *Cannabis* to participate so as to compare their respective answers as to their KAP regarding *Cannabis*. The sampling strategy was selected based on study inclusion criteria indicated below and were excluded if they met any of the exclusion criteria. These criteria are discussed in the following sections.

4.6.1 Inclusion criteria

Inclusion criteria aim to define the characteristics that participants should require to ultimately answer the research question (Hulley et al., 2013). Participants were recruited into the current study based on the following criteria:

- Participants had to be of South African nationality and be currently residing in South Africa.
- Participants had to be older than 18 years of age and give informed consent.
- Participants had to be able to understand and communicate effectively in English or Afrikaans.

- Participants had to have some knowledge or at least heard of the term "*Cannabis*" or any of the synonyms or slang words referring to "*Cannabis*".
- Participants had to be able to access the internet, Microsoft Teams© with a microphone and audio.

4.6.2 Exclusion criteria

Exclusion criteria aim to set boundaries and identify features that would eliminate potential participants (Garg, 2016). Since *Cannabis* is often associated with criminal activities (Burke & Marx, 1971; Fetherston et al., 2005; Paterson, 2009) and is often seen as controversial, interviewing participants on a potentially sensitive topic may lead to participants being unwilling to partake in the study. In addition, participants may choose not to disclose their feeling towards *Cannabis*. Hirst et al. (2017) suggested that some individuals may have a fear of being judged or miss career advancements due to their opinion towards *Cannabis*. Therefore, participants who were unwilling to partake in the study or who were unwilling to answer questions regarding their feelings toward *Cannabis* were reassured as to their option to withdraw and were excluded from the study.

In addition, caution should be taken with a topic that participants have not considered prior to partaking in the study as it can increase the risk of falsely assuming attitudes (Cleland, 1973). *Cannabis* does, however, have many synonyms and informal references such as "hemp", "marijuana", "pot" and "dagga" (Lexico, 2021) and this should be taken into consideration when recruiting participants into the study based on their familiarity with the plant. If study participants are, however, not familiar with the term *"Cannabis*" or any of its synonyms, they would not be able to answer questions regarding their KAP of *Cannabis* and were, therefore, excluded from the study. The size of the study participant sample was determined by the contact between the interviewer and the participant necessary to obtain sufficient data, as well as the richness and depth of the data (Ngulube & Ngulube, 2017). This categorisation assisted with identifying and establishing the knowledge-attitude-perception/practice relationship. Furthermore, data saturation determined when data collection was complete (Gentles et al., 2015). The following section will discuss how data were collected for this research study.

4.7 DATA COLLECTION

Once the research design, research setting and the sampling strategy was established, the process of data collection could commence. The task of data collection involved established, systematic gathering and examinination of data (Kabir, 2016) so as to address the research problem (Kothari, 2004). Furthermore, primary data gathering techniques were employed, which aimed to gather data directly from the source (FormPlus, 2021). Consequently, the inclusion criteria were formulated to ensure that each research question was appropriately answered. The main method of data collection was individual interviews with the assistance of an interview guide. The data collection procedure took place between July 2021 and November 2021.

The second data gathering instrument that was employed within this study involved focus groups led by a moderator guide. Only two focus groups were held, which rather served as being supplemental to the main data collection instruments. Both the interview guide and the moderator guide comprised open-ended questions designed to assist the researcher in exploring a broad set of ideas, attitudes and opinions regarding the subject at hand. The questions that were asked during the individual interviews as well as the focus groups are displayed in Tables 4.2-4.4. Qualitative studies are guided by the principle of data saturation, making the process of data collection and data analysis occur concurrently (Nieuwenhuis, 2016). The following sections will elaborate on how data were collected and analysed.

4.7.1 Data-gathering instruments

This study employed two data-gathering instruments. The main data gathering instrument was one-on-one, or individual, interviews which were supplemented with two focus groups. The proceedings were recorded on Microsoft Teams© whilst field notes were taken and the researcher asked follow up questions where necessary.

4.7.1.1 One-on-one interviews

One-on-one interviews are commonly used in qualitative research as a data gathering instrument (Ryan et al., 2009). However, *Cannabis* is widely considered to be controversial (Burke & Marx, 1971; Luginbuhl, 2001; Fetherston et al., 2005; Russo, 2007; Paterson, 2009; Aviram & Samuelly-Leichtag, 2017; Bouquié et al., 2018; Romero-Sandoval et al., 2018) and this may intimidate participants from answering truthfully (Hirst et al., 2017). Therefore, it is, important to ensure that the questions are approached with caution so as not to offend study participants as this may influence the value of the data (Kumar, 2011). Consequently, one-on-one interviews were held to ensure that participants were not intimidated by the presence of other participants and that they were sufficiently comfortable to answer possibly sensitive questions. Furthermore, one-on-one interviews ensured increased accuracy in determining participant subjective and objective knowledge (Dawson, 2002) since participants were not able to rely on other participants' answers.

Babbie (2008) identified three interviewing methods, namely structured, semi-structured and unstructured interviews. Whilst structured interviews follow a strict format without deviation from the topic, unstructured interviews entail a conversation between interviewer and interviewee regarding a broader topic, without a specific framework (Ryan, 2009). Furthermore, the semi-structured interview takes a conversational approach, with a list of questions to guide the interviewer (Brink et al., 2018). An interview guide ensures order and structure within the interview and that the correct questions are asked in order to gather the appropriate data (Bryman et al., 2014). In the current study, the interviews were conducted in English and/or Afrikaans, in a semi-structured manner. This interviewing method allowed the interviewer to probe further questions to gain an in-depth understanding regarding the specific questions being asked.

The questions in the individual interview guide (Appendix H) were structured to interrogate the specific objectives of the study. Firstly, the questions were aimed at determining the level of subjective and objective knowledge the participants possess surrounding *Cannabis*. Secondly, study questions explored participant's attitude regarding *Cannabis*, followed by exploring participant perception/practice of *Cannabis*. Interviews were held until the point of data saturation was reached and each took between 20 to 30 minutes. Data saturation refers to the point during data collection when no new information or data are observed (Kumar, 2011). Guest et al. (2006) suggested that 12 interviews be sufficient in a homogenous sample while Marshall et al. (2013) recommend 15 to 30 interviews. In the current study, it became evident that study data were saturated after the 23rd interview and the researcher continued to conduct interviews to ensure that data saturation was indeed reached.

4.7.1.2 Focus groups

The second data-gathering instrument involved interviewing online focus groups. Focus groups are useful in understanding or explaining how attitudes and behaviours are influenced by factors such as culture and beliefs (Rabiee, 2004). Some research suggests that participant engagement in focus groups discussing possibly sensitive topics may be limited (Kaplowitz, 2000; Wutich et al., 2010). However, other studies suggest that focus groups may yield complementary data to individual interviews (Wellings et al., 2000; Lambert & Loiselle, 2007). Similarities and differences between participants may, furthermore, assist with enhancing the richness of data and provide the researcher with a range of experiences and perspectives (Lambert & Loiselle, 2007). A homogenous group is, however, suggested as this would encourage participants to share more of their experiences and opinions with the interviewer (Krueger & Casey, 2014). Thus, in the present study, two separate focus group interviews were held, each involving five to eight participants, where one focus group consisted of participants who have used *Cannabis* and the other focus group that consisted of members who have not yet used *Cannabis*. Only two focus groups were held with the aim of gathering supplemental data and therefore were not held until the point of data saturation.

The speaking time of participants in focus groups versus individual interviews is often overlooked and so Schwab (2020) suggested that individual interviews allow for more in-depth data collection. This was evident as in the present study, interview time for the focus groups were 34 minutes between five participants and 45 minutes between six participants, respectively, allowing for seven to eight minutes' speaking time per participant as opposed to an average of 20-30 minutes per individual interview. Combining interviews with focus groups does, however, increase the accuracy of the research and its findings (Bryman et al., 2014) and focus groups were therefore included as a data gathering instrument.

Then et al. (2014) suggested the use of a focus group moderator guide (Appendix I – participants that have consumed *Cannabis* and Appendix J – participants that have not consumed *Cannabis*) that contains engagement questions, exploration questions and an exit question. Engagement questions are

intended to encourage participant involvement. Exploration questions aim to gain insights into the topic and finally, exit questions aim to reconfirm the data gathered (Then et al., 2014). The questions used for the focus groups were based on the questions in the individual interviews but were broader in scope and more engaging in order to encourage a conversation between participants and interviewer. The following section elaborates further on the design and layout of the data-gathering instruments.

4.7.2 Design and layout of the one-on-one interview and focus group questions

As discussed in section 4.6, the researcher recruited participants based on their eligibility to meet the inclusion criteria. Once the participant had verbally agreed to partake in the study, each had to provide his/her email address. The researcher included three documents in the email correspondence with the participant: the participant information sheet (Appendix B – Individual interviews; Appendix C – Focus group); the consent form (Appendix D – Individual interviews; Appendix E – Focus group), and a demographics form. The demographics form can be seen below in Table 4.1.

TABLE 4.1: DEMOGRAPHICS FORM

Answer the following questions by crossing (X) in the correct box.

SECTION A – *Cannabis*

1.1. Have you heard of or do you have knowledge of the term *Cannabis* or any of its synonyms ("hemp", "marijuana", "pot" or "dagga")?

Yes	1
No	2

1.2. To the best of your knowledge, have you ever consumed *Cannabis* or products including *Cannabis*?

Yes	1
No	2

SECTION B – Demographics

2.1 What is your gender?

Male	1
Female	2
Prefer not to say	3

2.2 What year were you born?

Older	1
1940-1949	2

1950-1959	3
1960-1969	4
1970-1979	5
1980-1989	6
1990-1999	7
2000-2003	8

2.3 In what province do you currently reside?

Eastern Cape	1
Free State	2
Gauteng	3
KwaZulu-Natal	4
Limpopo	5
Mpumalanga	6
Northern Cape	7
North-West	8
Western Cape	9

2.4 What is the highest level of education you have completed?

None	1
Primary school	2
Grade 8 – 10	3
Grade 11 – 12	4
Tertiary education	5
Prefer not to say	6

2.5 In which sector do you currently work?

(please complete on the bottom line)

_____

The design of the research questionnaire determines the data that will be obtained and, consequently, it is important to consider the question sequence and wording (Maree & Pietersen, 2016b). In the current study, questions were formulated to ensure that the participants' answers ultimately contributed towards the study objectives. In addition, the questions from the interview and moderator guides aimed at

exploring how a component of the knowledge-attitude-perception/practice triad regarding *Cannabis* and *Cannabis*-infused snacks may affect the other two components of the triad.

Questions were formulated based on previous studies aimed at determining (amongst others) consumer knowledge, attitudes and perception/practice in relation to *Cannabis* (Giandelone & Luce, 2019; Philpot et al., 2019; Cowling, 2020; Kruger et al., 2020; Wheeler et al., 2020; Zeiger et al., 2020). Only one of these studies, however, focussed on the knowledge-attitude-perception/practice triad and this study did not consider perception as being related to practice (Zeiger et al., 2020). In addition, these studies did not necessarily use an open-ended qualitative format in collecting data and so indepth answers were therefore not obtained. Tables 4.2 - 4.4 represents the research questions aimed at answering the study objectives.

TABLE 4.2: INDIVIDUAL INTERVIEW QUESTIONS

OBJECTIVE 1: To explore South African consumer's knowledge regarding fibre-type *Cannabis*.	
Objective 1.1: To explore South African consumer's subjective knowledge regarding fibre-type *Cannabis*.	1. What do you know about *Cannabis*? 2. What do you think are the benefits associated with *Cannabis*? 3. What do you think are the risks associated with *Cannabis*? 4. Do you think using *Cannabis* can be habit-forming or addictive?
Objective 1.2: To explore South African consumer's objective knowledge regarding fibre-type *Cannabis*.	1. What do you know about the chemicals in *Cannabis*? 2. Do you know the difference between Δ9-Tetrahydrocannabinol (THC) and cannabidiol (CBD)? 3. What do you know about the South African law regarding *Cannabis*?
OBJECTIVE 2: To explore South African consumers' attitude towards fibre-type *Cannabis*.	
1. What is your outlook on or attitude towards *Cannabis*? 2. How do you feel about South African legislation regarding *Cannabis*?	
OBJECTIVE 3: To explore South African consumers' perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods.	
1. Have you ever consumed *Cannabis* or products infused with *Cannabis*? 1.1. If **no**: 1.1.1. What was the reason? 1.2. If **yes**, 1.2.1.What was the reason?	

1.2.2. What was the method of consuming *Cannabis*?

1.2.3. How often do you consume *Cannabis*?

1.2.4. Did you know how to use the *Cannabis*, and if so, how did you go about with determining the dosage?

1.2.5. What was your experience with *Cannabis*? Why or why not did it meet or not meet your expectations?

2. Would you consume a snack infused with *Cannabis*?

TABLE 4.3: FOCUS GROUP QUESTIONS – PARTICIPANTS THAT HAVE CONSUMED *CANNABIS* OR *CANNABIS*-INFUSED PRODUCTS

ENGAGEMENT QUESTION	
1. What do you know about *Cannabis*?	
OBJECTIVE 1: To explore South African consumer's knowledge regarding fibre-type *Cannabis*.	
Objective 1.1: To explore South African consumer's subjective knowledge regarding fibre-type *Cannabis*.	1. What do you think are the benefits associated with *Cannabis*? 2. What do you think are the risks associated with *Cannabis*?
Objective 1.2: To explore South African consumer's objective knowledge regarding fibre-type *Cannabis*.	1. Do you know the difference between Δ9-Tetrahydrocannabinol (THC) and cannabidiol (CBD)? 2. What do you know about the South African law regarding *Cannabis*?
OBJECTIVE 2: To explore South African consumers' attitude towards fibre-type *Cannabis*.	
1. What is your attitude/outlook on *Cannabis*? 2. How do you feel about South African legislation regarding *Cannabis*?	
OBJECTIVE 3: To explore South African consumers' perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods.	
1. Do you use/Have you used *Cannabis* before? 1.1. What was the reason? 1.2. What was the method of consuming *Cannabis*? 1.3. How often do you consume *Cannabis*? 1.4. Did you know how to use the *Cannabis*, and if so, how did you go about with determining the dosage?	

1.5. What was your experience with *Cannabis*? Why or why not did it meet or not meet your expectations? 2. Would you consume a snack infused with *Cannabis*?
EXIT QUESTION
1. Is there anything else you would like to add about *Cannabis* that you might not have mentioned previously?

TABLE 4.4: FOCUS GROUP QUESTIONS – PARTICIPANTS THAT HAVE NOT CONSUMED *CANNABIS* OR *CANNABIS*-INFUSED PRODUCTS

ENGAGEMENT QUESTION	
1. What do you know about *Cannabis*?	
OBJECTIVE 1: To explore South African consumer's knowledge regarding fibre-type *Cannabis*.	
Objective 1.1: To explore South African consumer's subjective knowledge regarding fibre-type *Cannabis*.	1. What do you think are the benefits associated with *Cannabis*? 2. What do you think are the risks associated with *Cannabis*?
Objective 1.2: To explore South African consumer's objective knowledge regarding fibre-type *Cannabis*.	1. Do you know the difference between Δ9-Tetrahydrocannabinol (THC) and cannabidiol (CBD)? 2. What do you know about the South African law regarding *Cannabis*?
OBJECTIVE 2: To explore South African consumers' attitude towards fibre-type *Cannabis*.	
1. What is your attitude/outlook on *Cannabis*? 2. How do you feel about South African legislation regarding *Cannabis*?	
OBJECTIVE 3: To explore South African consumers' perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods.	
1. What was the reason for not consuming *Cannabis*? 2. Would you consume a snack infused with *Cannabis*?	
EXIT QUESTION	
Is there anything else you would like to add about *Cannabis* that you might not have mentioned previously?	

4.7.3 Pilot testing of the instruments

A pilot test of the instruments, also known as a feasibility study (Kumar, 2011), serves as a preliminary test that aims to trial the viability of data instruments (Kothari, 2004) before the actual study commences. A small-scale sample is recruited that meets the inclusion criteria (Kumar, 2011). Both the sample and data obtained during the pilot test are excluded from the main study (Brink et al., 2018). Furthermore, the pilot test seeks to indicate if the data instrument is able to answer the objectives of the study (Glaser & Strauss, 2000) and questions from the data instrument are proofread beforehand to avoid ambiguity (Dawson, 2002). Based on the findings obtained from the pilot test, the questions are reformulated accordingly (Gumucio et al., 2011).

In the present study, two pilot tests were conducted to test both the focus group moderator guide as well as the one-on-one interview guide. The pilot focus group and the pilot one-on-one interview was held virtually using Microsoft Teams©. This online platform allowed the researcher to record the proceedings (Microsoft, 2021) and encouraged social distancing to reduce the spread of the COVID-19 virus (World Health Organisation, 2020a).

The participants that met the inclusion criteria were recruited by means of convenience sampling for the pilot test. The researcher obtained consent from the relevant managers and recruited colleagues to partake in the study. The participants received a participant information sheet in addition to a consent form that was required to be signed prior to their participation in the study. The focus group initially consisted of six participants, however one of the participants had technical difficulties and could not successfully partake and only five participants were present during the focus group. The sample and findings from the pilot one-on-one interview and the pilot focus group were not included in the study findings.

The semi-structured format of the data instrument assisted the researcher to probe further questions in a conversational manner (Marvasti, 2004). The researcher therefore only made slight changes by reorganising the question order in the one-on-one interview questions to ensure that they were clear and comprehensive to the participants, addressed the research aim and objectives and improved the conversational flow. The focus group moderator guide was also changed slightly, as the initial questions was not sufficiently directed to answering the research objectives. Conducting a pilot test of the data instruments assisted the researcher to prepare accordingly for the data gathering process. In addition, by conducting a pilot study, any potential problems that may have occurred during data collection, which might subsequently have influenced the findings, were mitigated.

4.7.4 Main study data-gathering procedure

The participants that met the inclusion criteria were emailed an electronic Microsoft Teams© invitation to participate in the study. Participants had to complete the demographics form and had to sign the consent form and submit both forms to the researcher prior to the one-on-one or focus group interview.

The participant would then communicate a convenient time and date for each to participate in the study. Both the one-on-one interviews and the focus groups were held on Microsoft Teams©. By using Microsoft Teams©, participants had the option to use pseudonyms as their display names in those cases where they wanted to protect their identity and retain information confidentiality. Moreover, those partaking in the focus groups were made aware that they would be participating in a group format. Finally, participants were not required to use their cameras which assisted to further protect the identity of participants as well as to prevent the call from lagging and not to affect the value of the data.

Once the interview or focus group started, the researcher would thank participants for their time. Participants were reminded that the interview or focus group was being recorded and that the recordings in addition to participants' personal information would be kept confidential and only made available to the researcher and study supervisors. In addition, participants were reminded that their participation was voluntary and that they would be free to withdraw without needing to give a reason. Participants were encouraged to answer the questions as this was better than not saying anything. In addition, participants were reminded that there were no correct or incorrect answers and that any answer would be data for the study, as long as they answered truthfully. Finally, the researcher asked the participations if they had any other questions before starting with the interview.

The questions were displayed on Microsoft Teams© using the "Screenshare" option to ensure participants could see the question and answer accordingly (Figure 4.1). The one-on-one interviews were held in a conversational manner and the researcher would ask follow-up questions when deemed necessary to ensure that the researcher understood the opinions, experiences and views in the way the participant intended. Alternatively, the focus groups were led by a moderator guide.

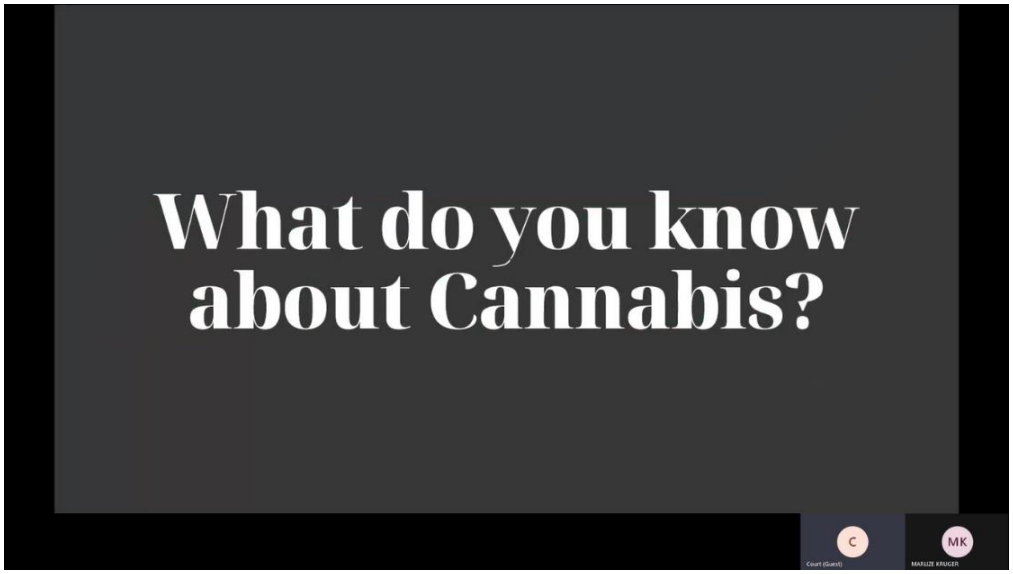

FIGURE 4.1: EXAMPLE OF AN INTERVIEW AND FOCUS GROUP QUESTION BEING DISPLAYED ON MICROSOFT TEAMS© USING THE "SCREENSHARE" OPTION.

Participants in the focus group were asked to use the “Raise hand” and “Mute” functions (Figure 4.2) in Microsoft Teams© to ensure order during the proceeding and to ensure participants weren’t disturbed by background noise which might influence the value of the data. Each of the individual interviews lasted an average of 20 minutes, whilst each of the focus groups took on average of 40 minutes.

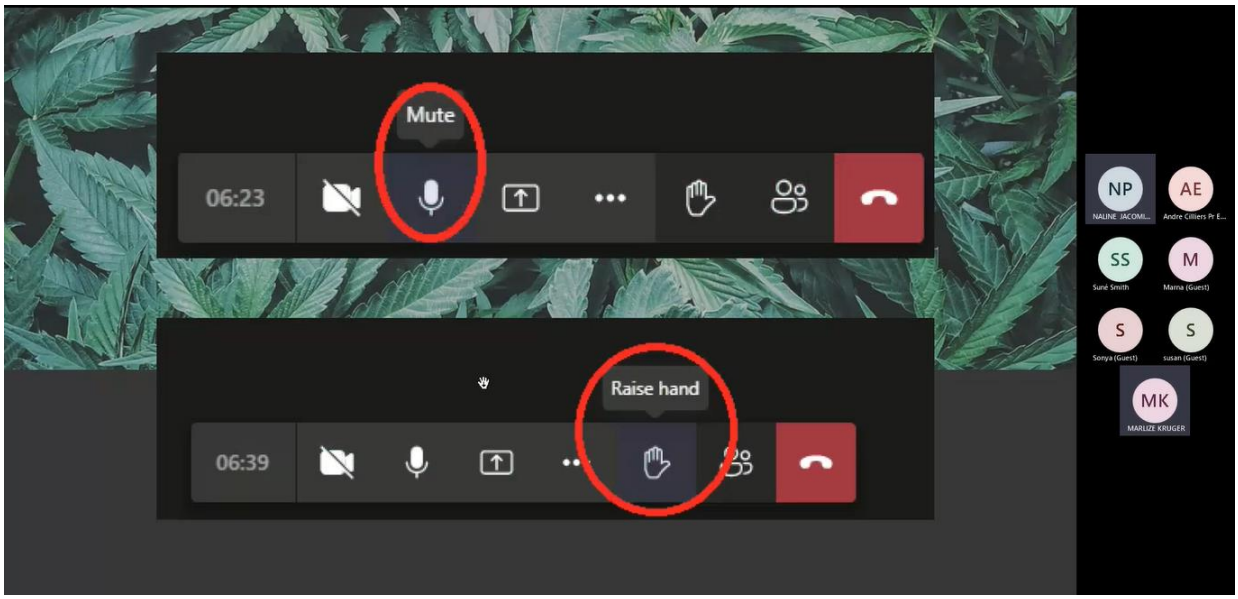

FIGURE 4.2: “MUTE” AND “RAISE HAND” FUNCTIONS OF MICROSOFT TEAMS©.

Upon closing the focus groups and interviews, the participants were asked if they had anything else to contribute and were thanked for their time and contribution. Participants were also willing to review the transcriptions to ensure the data were captured accurately and truthfully. In total, 23 interviews were held until no new data surfaced and two additional interviews were held to ensure saturation had indeed been reached. The two focus groups consisted of six and five participants, respectively, so that, together with the 25 interviews, a total of 36 participants were included in this study. Data saturation was not necessarily reached after the two focus groups, as the focus groups only acted as a supplemental data-gathering instrument. The next section deliberates the data analysis procedure.

4.8 DATA ANALYSIS

In contrast to quantitative data analysis that uses established, statistical methods, analysis of qualitative data may make use of different means of analysis (Walliman, 2011). Qualitative research generates a large amount of data that is usually in the form of recordings or video footage which is difficult and time-consuming to analyse (Brink et al., 2018). Raw qualitative data tends to be broad and vague and analysing it has, therefore, not been developed into an exact discipline (Walliman, 2011). The interviews and focus groups were recorded whilst field notes were taken. The digital recordings were then downloaded from Microsoft Teams© and transcribed on Microsoft Word®. Recordings and transcripts produced a large amount of raw data that are dispersed and difficult to understand (Walliman,

2011) but also allow the researcher to recall the exact data gathered (Marvasti, 2004). In addition, the process of transcribing data is a vital part in interpreting, making sense of the data and plays a role in the analytical process (Roulston, 2017) and so, the researcher opted to personally transcribe the data.

Both the interview and focus group recordings with their relevant transcriptions were stored electronically on password-protected hardware. The transcriptions will be stored for a five-year period after which it will be responsibly destroyed. Once all recordings were transcribed, the transcriptions were analysed by means of content analysis. Content analysis is a methodological approach that aims to identify concepts, patterns or themes from a piece of content (Luo, 2019), in this case, the transcriptions and is often employed as it assists the researcher in exploring participant attitudes, behaviours, emotions, opinions and values (Crosley, 2021). In addition, the frequency of certain themes or concepts can also be explored by tabulating quotes and the number of times they occur (Crosley, 2021). Specific categories that emerged from the transcriptions were grouped into relevant codes.

Since the individual interview guide and focus moderator guides were set up according to the objectives of the study, the data that emerged from the asked questions were able to address the study objectives. The questions were aimed at exploring consumer subjective knowledge, objective knowledge, attitudes and perception/practice regarding *Cannabis*. The topic concerning a piece of text or data is marked by a code (Crosley & Jansen, 2020) and the process of coding refers to categorising data into groups by means of labels or symbols until meaningful theories emerge (Kothari, 2004). In the current study, the participant responses that emerged from the interview questions were categorised according to specific codes that assisted the researcher in summarising the vast amount of raw data which in turn, facilitated the analysis process (Medelyan, 2021). Furthermore, inductive coding was used to categorise the data. Open or inductive coding aims to create concepts or themes emerging from the interpretations of the data (Glaser, 2016). Codes are therefore built from data and are best suited for an explorative research design (Crosley & Jansen, 2020). Yi (2018) suggested to start with initial coding as a means to familiarise the researcher with the data and then to move over to line-by-line coding, which aims to code all data regardless of relevance.

The University of South Africa (UNISA) offers a variety of software packages available to students including Atlas.Ti© (University of South Africa, 2020). Atlas.Ti© assists with coding unstructured data, organises the categories and, finally, facilitates the process of finding relationships between codes (Friese, 2014). Using a software program ensured that the process of data analysis was objective, consequently enhancing the quality, rigour and trustworthiness of the research (Welsh, 2002). The coding process was then checked and verified by the researcher to ensure that the software encoded accurately. In addition, the researcher also constantly reviewed and compared the data to determine consistency in the codes (Moghaddam, 2006). The categories and subcategories that emerged from the

data were then visually represented through diagrams that facilitate data interpretation for the researcher (Lewis, 2015).

Data interpretation is an iterative process requiring that the researcher work thoroughly through the relevant data and categories to find explanations before drawing conclusions (Suter, 2011). The data interpretation process was conducted with the research aim and objectives in mind, whilst connecting the data with existing literature (Monash University, 2020). In addition, as some of the literature was not yet known during the early stages of the study, novel, relevant literature should also be constantly compared to the emerging data from the study (Suter, 2011). The researcher, therefore, compared the categories that emerged with existing research from similar studies to substantiate the data obtained (Rugg, 2010). By following these steps, the researcher was able to draw meaningful conclusions that related to the aim and objectives of the study. During the interpretive process, the researcher also ensured that the data and conclusions were dependable and trustworthy.

4.9 TRUSTWORTHINESS

Validity and reliability in qualitative research designs are often viewed with scepticism (Brink et al., 2018), since qualitative methods often risk being subjective (Bryman et al., 2014). The terms 'validity' and 'reliability' are often replaced in qualitative research with 'trustworthiness' or 'rigour' which can be defined as the comprehensive and systematic approach to data collection that delivers trustworthy, dependable and credible data with epistemological and methodological correspondence (Brink et al., 2018). Trustworthiness and rigor can be ensured by addressing the four factors - dependability, credibility, confirmability and transferability (Lincoln & Guba, 1985).

4.9.1 Credibility

Credibility, also referred to as internal validity, refers to the accuracy and integrity of the research and its findings (Pandey & Patnaik, 2014) which aims to answer the question of how the findings correspond with reality (Shenton, 2004). Patton (1999) mentioned that the credibility of the researcher adds to the confidence in the final research findings. Elo et al. (2014) suggested examining the raw data carefully and critically to ensure the researcher's actions are appropriate. In the current study, the pilot studies, focus groups as well as the one-on-one interviews were, therefore, conducted, recorded, transcribed and critically reviewed by the researcher throughout the data-gathering procedure. Furthermore, triangulation and member checking were two additional techniques used to ensure research credibility (Statistics Solutions, 2021).

Triangulation refers to methods that will ensure data obtained from the study are credible, systematic and rigorous (Cohen et al., 2007). Triangulation may often be time-consuming and add complexity (Johnson et al., 2017) but can add to richness in obtaining a more comprehensive understanding of the data (Heale & Forbes, 2013). Triangulation can be achieved through the combination of theories, methods, data and/or research (Denzin, 2017). The current study used methodological in addition to

data triangulation. Methodological triangulation refers to employing different methods on the same subject or the same methods at different times or on different subjects (Cohen et al., 2007). Using more than one method to study a phenomenon may reduce the risk of bias and contribute to data saturation (Fusch et al., 2018). This study used interviews as the main data gathering instrument, combined with two focus groups as different instruments to triangulate the findings and interviews, until the point of data saturation was reached. Furthermore, data triangulation refers to combining sources of data from persons, time and space to increase the validity and reliability of the results (Rugg, 2010). Korstjens and Moser (2018) suggested that including participants with different perspectives regarding the topic of interests would further add to the credibility of the study. In the current study, the researcher used purposive and referral sampling to select participants with different views regarding *Cannabis* so as to gain data from different viewpoints.

Finally, member-checking is the process whereby data are shared with participants to correct possible errors, provide additional information and to clarify intentions (Statistics Solutions, 2021). Since the researcher and participants are able to view the raw data from a different perspective, this may further strengthen the data obtained (Korstjens & Moser, 2018). Consequently, the researcher emailed each participant with a request to review their transcription along with the interview recordings to discuss or approve the accuracy of the transcription and to clarify any misinterpretations.

4.9.2 Transferability

Transferability, also known as external validity, refers to how the data can be applied or transferred to other settings or contexts using different respondents (Pandey & Patnaik, 2014). Transferability can be ensured by thick descriptions which refer to a detailed illustration of the phenomenon and providing appropriate background of the research to give context and ensure clarity of how the research was conducted (Shenton, 2004). Thick descriptions, therefore, allow behaviours and experiences from the researcher to become meaningful to an outsider (Korstjens & Moser, 2018). Transferability was ensured by giving an in-depth description of the research setting, the unit analysis, the sampling strategies, the inclusion and exclusion criteria, the research instruments, the data collection procedure and the data analysis procedure. Even though the purpose of the current study was to explore, rather than to generalise, purposive and referral sampling was used to represent a variety of viewpoints and interviews were conducted until the point of data saturation to increase the likelihood of transferring the research to other groups or settings.

4.9.3 Dependability

Dependability, also known as reliability, refers to consistency in results so that, if the study was repeated, similar findings would be obtained (Shenton, 2004). This can be ensured by means of a detailed audit trail and review of the study by an external auditor or peer (Pandey & Patnaik, 2014). The current research was peer reviewed by the study supervisors in addition to the College of

Agriculture and Environmental Sciences Health Research Ethics Committee (HREC) authorities from the University of South Africa. Furthermore, the research procedure was logically and sequentially documented with raw data and transcriptions kept safe in a password-protected computer. All changes that happened during the research process and the reasoning behind these changes was documented and made available for external reviewers to follow and repeat.

4.9.4 Confirmability

Confirmability refers to objectivity during the research procedure (Pandey & Patnaik, 2014) which aims to ensure that the findings of the study were derived from actual data (Korstjens & Moser, 2018). In addition, Shenton (2004) suggested that objectivity is ideal if it does not depend on human judgement or skill. The researcher, therefore, used a software program, Atlas.Ti©, that acted as a support function to analyse the study data without bias. Atlas.Ti© was able to code transcriptions according to different themes that facilitated the process of objectively finding patterns and theories (Friese, 2014).

Furthermore, the issue of objectivity exists due to the risk of researcher bias as well as incorrectly applying irrelevant data in the study (Kothari, 2004). The transcriptions of the interviews and focus groups were, therefore, sent to participants to ensure the researcher did not misinterpret or leave out any data. It is imperative that the data collected should represent participant views and not that of the researcher (Shenton, 2004). Confirmability can also be addressed by comprehensively describing the process of data collection and analysis by means of an audit trail (Pandey & Patnaik, 2014). All research steps taken during the research process were, therefore, transparently described throughout the research procedure and records were kept of all the proceedings on a password-protected computer.

4.10 ETHICAL CONSIDERATIONS

According to the Oxford Dictionary (2020), ethics can be defined as “Moral principles that govern a person's behaviour or the conducting of an activity”. Thus, research ethics can be referred to as the moral principles guiding the researcher during the research process (Bhole, 2015). The data obtained should, therefore, be represented accurately and not invented, plagiarised nor manipulated (Brink et al., 2018). Furthermore, in social research, the researcher has an obligation towards study participants and is responsible to prevent harm to participants and ensure they are treated with respect (Marvasti, 2004). It may be that the information disclosed by participants are deemed sensitive and it is imperative that the researcher is considerate towards both the participants and the information obtained (Dawson, 2002).

Before commencing with the research study and data collection process, ethical clearance was obtained from the College of Agriculture and Environmental Sciences Health Research Ethics Committee (HREC) at the University of South Africa (UNISA) which is registered with the South African National Health Research Ethics Council. Appendix A refers to the CAES Ethics Approval (Reference no.: 2021/CAES_HREC/038) and as UNISA uses internationally recognised ethical principles as a

foundation, UNISA research is guided by integrity, accountability and enables researchers to conduct a research practice that is ethically responsible (University of South Africa, 2016). Likewise, it is the responsibility of the research team and the UNISA administrative employees to uphold anonymity, confidentiality and privacy of participants during the research process (University of South Africa, 2016).

Thus, participants were approached in a manner that ensured respect and the researcher gained verbal consent from prospective participants to take part in the study. Next, participants were supplied with an information sheet (Appendix B – Individual interviews; Appendix C – Focus group) that provided the prospective participant with necessary information surrounding the study. The information sheet communicated the data collection procedure and possible benefits of the study in addition to emphasizing that participation was voluntary, any possible participation risks and how participant anonymity would be ensured. Once the participants agreed to partake in the study, participants had to sign a consent form (Appendix D – Individual interviews; Appendix E – Focus group) that was clear and represented in English. It is important that both the consent form as well as the information form was unambiguous, easy to understand and that participants are made aware that they may withdraw from the study if they felt uncomfortable.

Ethical considerations are especially important, considering that participants were interviewed on a possibly sensitive topic such as *Cannabis*. Marvasti (2004) suggested that in the case where there is reference to specific participants, the use of fictional names can help hide participant identity. One-on-one interviews and focus groups were, therefore, conducted on Microsoft Teams© where participants had the option to use pseudonyms and not be identified to further ensure confidentiality and anonymity. Upon starting with the interview or focus group, the researcher reiterated important information and participants were granted a final opportunity to ask questions if they were unsure. Finally, it should be noted that no incentives were offered to participants to take part in the current study.

4.11 CONCLUSION

This chapter discussed the research aim and the study objectives implemented to ultimately answer the research questions. The qualitative exploratory research design was discussed as well as the rationale behind employing the specific study approach and design. The research setting employed Microsoft Teams© and even though this setting had some limitations, such as absence of verbal cues and body language, its use was cost-effective and assured participant anonymity. Participants were selected by means of non-probability sampling techniques, specifically snowball, convenience and purposive sampling. Sampling was based on specified inclusion and exclusion criteria. The process of data collection was then discussed regarding individual interviews and the accompanying interview guide as the main data-gathering instruments. Supplementary to the individual interviews were two focus groups that were discussed. One focus group comprised *Cannabis* users and one comprised *Cannabis*

non-users and the respective moderator guides were also discussed. The process of the pilot testing of both individual interviews and focus groups with their respective guides were lastly discussed in the data collection section. The procedure of data analysis followed, which included how data were transcribed and analysed according to specific categories and sub-categories subsequent to participant responses. Next, the study's trustworthiness was then discussed and how it was addressed by ensuring credibility, transferability, dependability and confirmability followed by ethical issues that were considered for this study.

The interpretation of data obtained from the current study is presented in Chapter 5 in accordance with the questions from the data instruments and in relation to the study objectives.

CHAPTER 5 – RESULTS AND DISCUSSION

The findings from the study are discussed in this chapter according to the research objectives and the interpretation of the findings are presented in figures and tables.

5.1 INTRODUCTION

The aim of the study was to explore South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis* and *Cannabis*-infused snack foods and Chapter 4 discussed the research methodology and design implemented to address the study aim. Data were collected from semi-structured individual interviews that were supplemented with two semi-structured, homogenous focus group interviews. Qualitative research paradigms allowed the researcher to explore participants' knowledge, attitudes and perception/practice of *Cannabis* and its inclusion in snacks. The first section of this chapter discusses the participant demographic data and the following sections discuss the data according to each objective.

5.2 BACKGROUND OF THE STUDY SAMPLE IN BRIEF

Data saturation was reached after 23 interviews and the researcher conducted two more interviews to ensure data saturation had, in fact, been reached. There were, therefore, 25 individual interviews. In addition, two homogenous focus groups were held where one focus group comprised six participants and the other focus group consisted of five participants, so that a total of 36 participants contributed to the findings of this study. Non-probability sampling was used to recruit participants based on the inclusion criteria that required participants to: be of South African nationality; be residing in South Africa; be older than 18 years; be able to communicate in English or Afrikaans; have heard of the term "*Cannabis*", and have access to the internet, Microsoft Teams© with microphone and audio. The study was not intended to target a specific demographic to form part of the study and the view of any participant that met the inclusion criteria was considered for the study. Furthermore, it should be noted that all participants and prospective participants (taking part in the study or not), had heard of the term *Cannabis* or its synonyms.

The participants were evenly spread between males and females but the majority of participants (54%) were female. More than three quarters (78%) of participants were younger than 41 years of age, with the majority of these participants (42%) aged between 22 and 31 years. Participants were mostly located in Mpumalanga (36%) and Gauteng (36%), with the remaining participants residing in the Limpopo Province (11%), Western Cape (8%), KwaZulu-Natal (6%) and the Eastern Cape (3%). Educationally, the sample did not represent the South African population, where 7% have a tertiary education (Organisation for Economic Co-Operation and Development, 2019), as the majority of the participants (78%) had a tertiary education with the remaining participants having a National Senior Certificate (Grade 12). It is also noteworthy that with the exception of one participant who did not have a tertiary education, all participants were students studying towards a tertiary qualification. Participant

occupation varied greatly but the largest portion of participants were in the educational sector (19%), marketing and communication (11%) and were students (11%). Participants in the "other" category (19%) worked in different sectors such as insurance, property management, aviation, sales and law with one participant being self-employed while only one participant was unemployed. Figure 5.1 illustrates participant demographic information by means of pie charts.

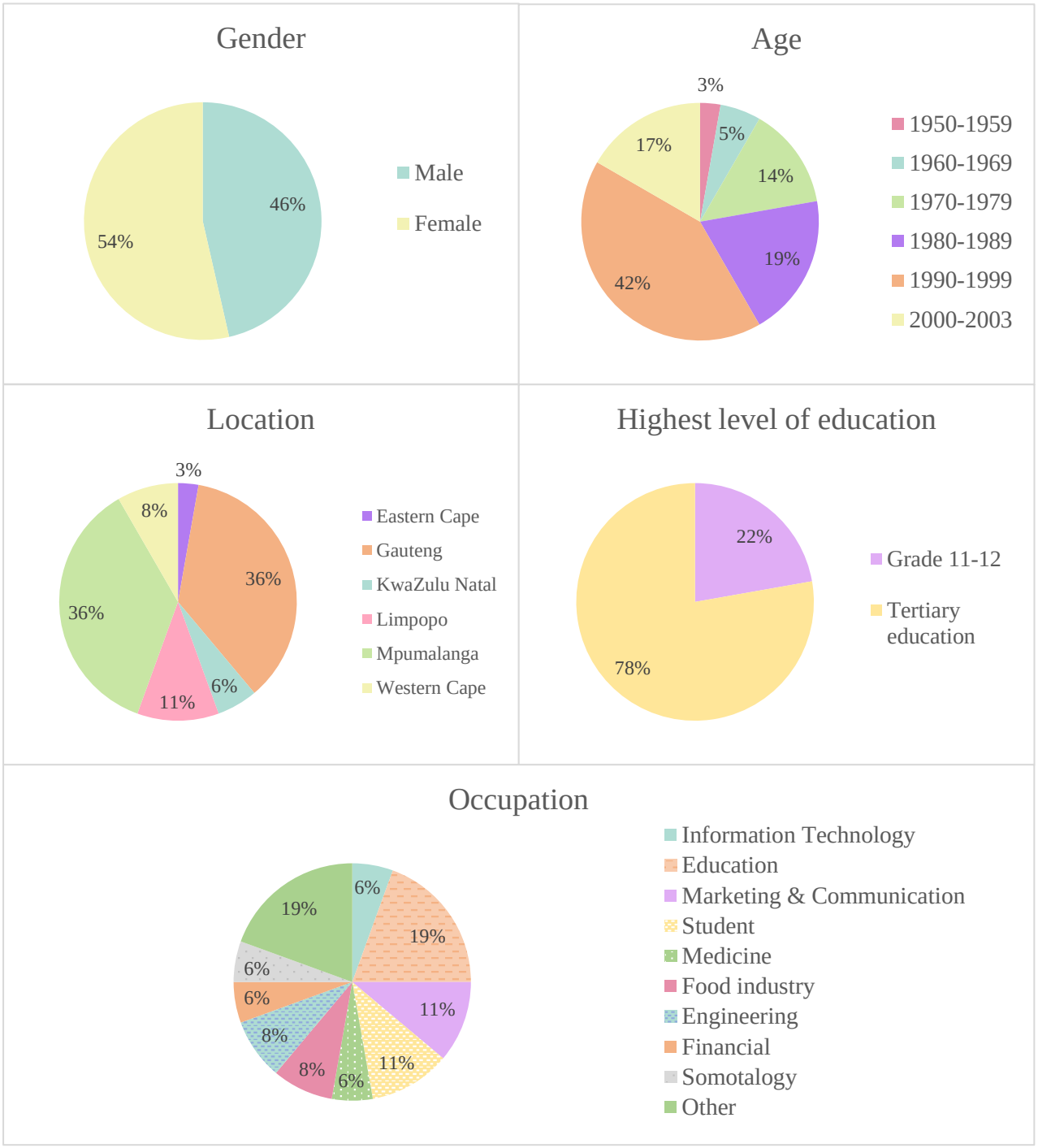

FIGURE 5.1: PARTICIPANT DEMOGRAPHICS (INCLUDING BOTH INDIVIDUAL INTERVIEWS AND FOCUS GROUPS).

The next section discusses the findings from the study according to specific study objectives. In this chapter, the categories that surfaced from the questions asked in the study interviews and focus groups are presented in figures to illustrate the study findings. The categories and sub-categories that emerged from the data are then discussed with reference to relevant literature. These categories and sub-categories are also tabulated with the respective participant quotes from the interviews and focus groups held. The first objective within this study, was to determine participant knowledge, specifically subjective and objective knowledge regarding *Cannabis*, and is discussed in the following section.

5.3 QUALITATIVE FINDINGS REGARDING PARTICIPANT KNOWLEDGE OF *CANNABIS* (OBJECTIVE 1)

The aim of this study was to explore the ***South African consumer knowledge, attitude and perception/practice (KAP) of Cannabis and Cannabis-infused snack foods***. Firstly, the data instruments for both the individual interviews and the focus groups were intended to explore participant knowledge (K) regarding *Cannabis*. Similar international studies have indicated that, due to the novelty of CBD, some participants were under the impression that CBD causes intoxication (Hudock, 2019) or haven't heard of CBD at all (Wheeler et al., 2020). The following section targeted subjective or self-assessed knowledge regarding *Cannabis*. Secondly, the data instrument questions for both the individual interviews and focus groups were targeted at determining participant objective knowledge. However, since participants in a focus group were able to rely on answers from other participants within that group, this section rather served as a data collection method to supplement data from the individual interviews.

5.3.1 Findings of participants' subjective knowledge regarding *Cannabis*

Subjective knowledge is the perceived knowledge of the consumer (Brucks, 1985) and is considered to be more likely to influence behaviour (Flynn & Goldsmith, 1999). Both Δ^9-tetrahydrocannabinol (THC) and cannabidiol (CBD) originate from the *Cannabis* plant (Ross et al., 2000). The first question was, therefore, aimed at obtaining a broader understanding of what participants knew about *Cannabis* which would then later focus on their knowledge regarding the specific phytochemicals present in *Cannabis*. The question "***What do you know about Cannabis?***" was aimed at starting a conversation to put participants at ease to preserve the value of the data as far as possible (Kumar, 2011), particularly since *Cannabis* is a potentially sensitive or controversial topic (Burke & Marx, 1971; Luginbuhl, 2001; Fetherston et al., 2005; Russo, 2007; Paterson, 2009; Aviram & Samuelly-Leichtag, 2017; Bouquié et al., 2018; Romero-Sandoval et al., 2018). This question was asked in both the individual interviews as well as the focus groups. Figure 5.2 illustrates the seven categories that emerged from the answers to the first question. The quotes that generated the seven categories are shown in Table 5.1.

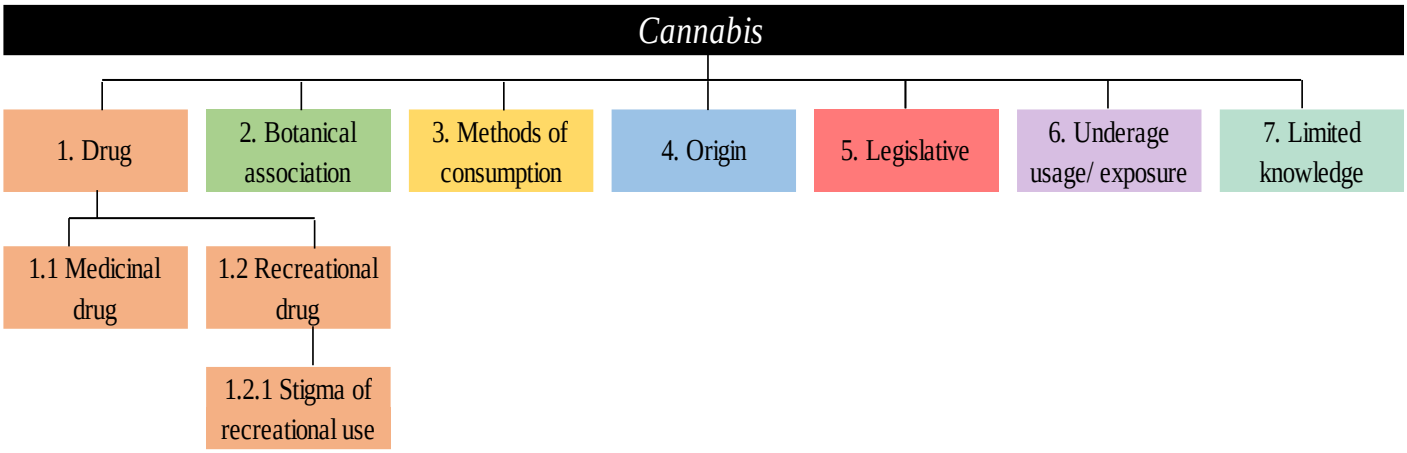

FIGURE 5.2: PARTICIPANTS' SUBJECTIVE OR SELF-ASSESSED KNOWLEDGE REGARDING *CANNABIS.*

The first category that emerged referred to *Cannabis* as being a drug, with participants referring to it as "*Classified as a drug*" or "*The dried leaves of the plant is used to make drugs*". From there, two sub-categories emerged, where participants referred to *Cannabis* as a recreational drug ("*I know that it can be smoked to get you high*" and "*I know it's been used for recreational purposes almost like alcohol*") as well as a medicinal drug ("*It is often cultivated for perceived medicinal needs*" and "*It has been gaining traction with medicinal research*"). Indeed, *Cannabis* has been recognised as one of the oldest domesticated plants, used in both medicinal and recreational applications (Li, 1974).

Furthermore, another sub-category emerged from the recreational drug sub-category, the stereotypic *Cannabis* users. Using *Cannabis* was formerly "*looked down on*" as it was "*strongly associated with criminal activities and wrong-doing*" and the user was likely to "*get involved with gangs*". Interestingly, the participants that contributed to this sub-category were older than 35 years (therefore, *Cannabis* has been illegal for the majority of their lives). Former research also indicated that respondents believed that *Cannabis* use was dangerous and problematic in their communities (Burke & Marx, 1971; Fetherston et al., 2005).

The second category that emerged was the botanical reference where participants mentioned that "*it is a plant in its natural form"* and "*you get male plants and female plants*" which are pollinated through wind (Amaducci et al., 2015). Some participants also mentioned that there are "*two varieties, sativa and indica*" which is an informal reference that emerged from, but unrelated to *C. sativa* and *C. indica* (McPartland & Guy, 2017). A common misconception amongst informal *Cannabis* distributors are that the two commonly referred to "strains" are responsible for either sedative or energizing effects, when in fact, *C. sativa* and *C. indica* refer to the botanical species and not necessarily their effects (Leafly Staff, 2018). In addition, even though still debated (McPartland & Guy, 2017) a third species, *C. ruderalis* also exists (Montserrat-de la Paz et al., 2014). Furthermore, one participant mentioned that the plant "*grows extremely big, depending on the tropics and where it is*" with the genetic constitution also impacting the size of the plant (Small & Marcus, 2002).

Furthermore, participants referred to the methods of consuming *Cannabis* which emerged as a third category. Participants referred to oral methods of consumption; "*I think it is dried and then consumed via inhalation or ingestion*" as well as external applications; "*You can use it in creams and lotions*" and "*I use it as an ointment for a skin rash*". Interestingly, no participants mentioned the consumption of hemp (seed or oil) up until this was mentioned later on in the interview, where only one participant mentioned the consumption of hemp (seeds and oil) and two participants made reference to the hemp industry.

Some participants also mentioned the origins of *Cannabis*, which emerged as a fourth category. "*I think it emanated from the Eastern countries*" and "*I know it's been in our history for a long time.*" with archaeological evidence dating back to almost 6,000 years ago suggesting that *Cannabis* is indigenous to China (Li, 1974). Interestingly, one participant referred to *Cannabis* as "*the drug they used as the holy oil*", with some authors believing, though not necessarily proven, that *Cannabis* was an ingredient in anointing oil in the Christian religion (Bienenstock, 2013; Admin, 2014; Deron, 2018; Lambert, 2018).

Another category that emerged was the legislative aspects surrounding *Cannabis*. One participant mentioned that *Cannabis* was "*in the news for getting legalised in certain states of the USA*". Washington and Colorado legalised *Cannabis* for recreational use in 2012 and 18 other states have legalised *Cannabis* since then (Hansen et al., 2021). *Cannabis* was also referred to as being "*legal in some sort of capacity in South Africa*" where "*you are not allowed to sell it and for your own use it is legal*". *Cannabis* was decriminalised in South Africa late in 2018 (de Villiers, 2018). In addition, one of the participants stated that: "*I think the whole reason for the legislation was that they want to promote an industry. They want to create space within the economic sector of South Africa for the Cannabis industry*" with the *Cannabis* for Private Purposes Bill being passed in 2020 (Vayej, 2020).

Two participants referred to cases where "*children purchase it [Cannabis] from school*" and "*use it wrongly*" which emerged as the sixth category. According to a media statement released by the Department of Social Development, *Cannabis* is the second most abused substance amongst adolescents with alcohol being the number one abused substance (Department of Social Development, 2021). This statement is supported by one of the participants in the educational sector who stated that "*we deal with it quite a lot in terms of abuse where learners are addicted to it [Cannabis]*". It is worth mentioning that the three participants that contributed to this category was not aware of THC or CBD (including their corresponding physiological effects), and there is the possibility of participants referring to THC rather than CBD.

Finally, some participants stated that they possessed limited knowledge on *Cannabis*. All of the participants that contributed to this category, had either never used *Cannabis* before, or had only used it once. Three out of the five participants within this group were born before 1989 while the remaining

two participants were in the 1990-2000 demographics group. However, one of these participants was being modest and actually possessed a fair amount of knowledge regarding *Cannabis*. The answers of the study participants regarding their subjective or self-assessed knowledge regarding *Cannabis* are tabulated in Table 5.1.

TABLE 5.1: PARTICIPANTS SUBJECTIVE OR SELF-ASSESSED KNOWLEDGE REGARDING *CANNABIS*

CATEGORY AND/OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. DRUG	**1. DRUG**	"is classified as a drug" 3 "The dried leaves of the plant is used to make drugs" 6 "it is a drug" 9 "Because of lies spread by big pharma, the last millennium the word '*Cannabis*' or 'marijuana' or 'dagga' was regarded as a recreational drug." 12 "Most people use it for medical reasons, some use it for fun." 14 "can be seen as a drug" 20 "could either be for medicinal purposes where apparently there has been studies linked to medicinal purposes or you can just use it for a recreational feel good drug" 1.1 "I think of it as a drug which can either be used recreationally or for medicinal purposes" 2.2 "I think generally the name *Cannabis* relates to a medical substance for me rather than a drug. I would rather say a 'drug' refers to the word 'dagga' or something like that" 2.3 "I also think of the more medicinal values that it has, but when I hear the word 'dagga', then I think of all the people using it for fun, when they party and things like that." 2.5	(n= 10)
	1.1 Medicinal drug	"It is often cultivated for perceived medicinal needs" 2 "you can use for different kinds of illnesses and aches" 5 "It has certain psychoactive properties when smoked or consumed in one form." 7 "I'm not sure if it's been medically tested yet, but you do get medical marijuana used in cancer, Parkinson's treatments... helps with seizures from Parkinson's" 8 "people use it as medication... they use the drops" 10 "pain relief and certain treatments" 11 "The *Cannabis* my dad utilised helped him sleep, took away a lot of the pain... "I think if they had to plant one hectare of *Cannabis* for every asthma tablet, and give us a medicated version of *Cannabis* – I think it would save a lot more lives." 12 "helps with stress relief" 13 "I also know that it is used for medicinal purposes, but not sure what purposes exactly" 17 "It has been gaining traction with medicinal research... there has also been a lot of studies done in terms of the health benefits" 20 "Over the years we (medical doctors) have become aware of the benefits and medicinal properties of the substance" 21 "In more recent years it has become a trend as you can use it as a medicine as well, so people aren't just using it as a recreational drug anymore." 23 "I do believe people use it if they've been diagnosed with cancer, I believe they use it for some form of a cure" 24	(n= 13)

CATEGORY AND/OR SUB-CATEGORY	QUOTE	REFLECTIVE NOTES
1.2 Recreational drug	"it makes you hyperactive and gives you more energy" 1 "classified as a hallucinogen" 3 "I know that it can be smoked to get you high" 4 "from a recreational perspective I sort of know how to roll a joint" 8 "I know it's been used for recreational purposes almost like alcohol" 11 "Brings people together" 13 "social *Cannabis* is marijuana" 14 "a lot of people smoke it to escape life" 17 "It makes you feel good... it makes you intoxicated like alcohol" 18 "during my studies we have learned about the harmful effects of marijuana and substance abuse, intoxication and all of that" 21 "people used it to relax, for recreational purposes" 24 "has the ability to improvise your current state of mind if you use it" 25 "When I think of *Cannabis*, I think of people using it to relax and for fun." 2.1	**Recreational drug** (n=13) **Stigmatised *Cannabis* use** (n=3) **Participants that stigmatised *Cannabis*:** Participants 2; 24 and 25 were 35 years +
1.2.1 Stigma surrounding recreational use	"the era in which I grew up, 'dagga' was strongly associated with criminal activities and wrong-doing" 2 "it was this really looked down on, on the people that used it." 24 "it might get you involved with a certain group of people that are consuming it on a regular basis or it might change your lifestyle... get involved with gangs or something" 25	
2. BOTANICAL ASSOCIATION	"It is a plant" 1 "I know it is a plant in its natural form" 2 "it comes from a plant" 3 "I know it is a plant, and you get male plants and female plants" 4 "The actual plant is referred to as one thing but it consist of many components, we only know about two, THC and CBD" 6 "two varieties, Sativa and Indica" 7 "It comes from a plant – I think the female plant" 8 "As for the plant, it grows extremely big, depending on the tropics and where it is. It is almost self-sustaining and you need to pick the buds if you are going to be selling. It grows very well in tropical areas with high heat and moisture like Venezuela, Brazil and the Amazon jungle." 12 "Greeny leaf plant" 14 "It is an herbal plant" 20 "Growing u you used to get hydroponics and microponics and then whatever regular soil plants" 22 "natural occurring plant... may lead to hallucinogenic properties that could be found in the pollen of the plant" 1.1 "I also know of different strains in *Cannabis* offer different effects. So some plants are more THC-focused whereas other plants are more CBD... it offers you different effects." 1.3	(n=13)
3. METHODS OF CONSUMPTION	"I think it is dried and then consumed via inhalation or ingestion" 2 "there's an oil made from it" 5 "I know it has quite a lot of health benefits when it is ingested. It can either be smoked or eaten or drank. It comes in many forms and there's oils " 15 "you can smoke it or you can eat it" 16 "you can boil it down to make an oil...you can use it in creams and lotions" 18 "I use it as an ointment for a skin rash" 19 "There is a resin type of product that is 'hash' or 'hasish'" 22 "some of the parts of the plant can be utilized in various forms for human consumption... either an oil can be extracted from it or it can be smoked" 1.1	(n=8)
4. ORIGIN	"It is a very old recognized plant. I think it emanated from the Eastern countries where the practice of consuming *Cannabis* is older than in the west" 2 "*Cannabis* have so many far reaching effects as far as the human body is concerned that dates back from when our creator walked on the earth and it was the drug they used as the holy oil." 12 "I don't know where exactly it comes from (originated) but I know it's been in our history for a long time in the history of the human race... our ancestors have used it ceremoniously" 13	(n=3)

CATEGORY AND/OR SUB-CATEGORY	QUOTE	REFLECTIVE NOTES
5. LEGISLATIVE ASSOCIATION	"Growing up, *Cannabis* was classified as a big 'no-no' topic" 4 "Legal in a lot of States in America... legal in some sort of capacity in South Africa" 8 "For some medical purposes it is legal... you are not allowed to sell it and for your own use it is legal" 9 "in the news for getting legalised in certain states of the USA... in South Africa there is also a court case as well about making it legal in your own garden and personal use" 11 "it was used a lot more broadly before the war on drugs in the USA, where legislation was passed to make it highly illegal" 13 "Prior years it was illegal, however recently 2015 or 2016 it became legalised in a lot more countries" 20 "The only thing I really know about it is that it used to be illegal for very long" 24 "I think the whole reason for the legislation was that they want to promote an industry. They want to create space within the economic sector of SA for the *Cannabis* industry, create jobs, and create revenue in the future, because the regulations are very stringent at the moment. But I think they want to create an environment in the future where trade would be possible and where it is regulated" 2.2 "the word '*Cannabis*' is very new to me, this came about when this whole thing about getting it more legalised" 2.4	(n=9)
6. UNDERAGE ASSOCIATION	"kids use it wrongly… children purchase it on school corners" 10 "In a school environment, we deal with it quite a lot in terms of abuse where learners are addicted to it and we obviously do not allow that. " 19	(n=2)
7. LIMITED KNOWLEDGE	"we heard about it, but there is not much knowledge that I have" 4 "I don't know much about it" 9 "I don't know much" 10 "I do not know that much" 17 "To be honest, I don't know too much about it" 21 "I think I am a bit more old school, I cannot even remember when I was in school, in the sixties and early seventies, whether I even knew about the existence of something like 'dagga' at the time. Until recently, I've never even seen a plant" 2.4	Participant 4; 9; 10; 2.4 was 35 years + Participant 4;9;10;17;21;2.4 either never used or only experimented Participant 21 was being modest - actually had good amount of knowledge (n=6)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

After discussing participant subjective or self-assessed knowledge regarding *Cannabis*, participants were asked "***What do you think are the benefits associated with Cannabis?****"*. From the benefits mentioned, the most prominent category that emerged was remedial applications. It should also be noted that to about half of the participants, *Cannabis* was seen as a single entity. Other categories that emerged were *Cannabis* being better or safer than other substances, the ability to advance the economy, using it for pets and as a social lubricant. In addition, there were participants who could not think of any benefits to consuming *Cannabis*. Figure 5.3 illustrates the benefits associated with *Cannabis* as mentioned by participants and the answers from participants are presented in Table 5.2.

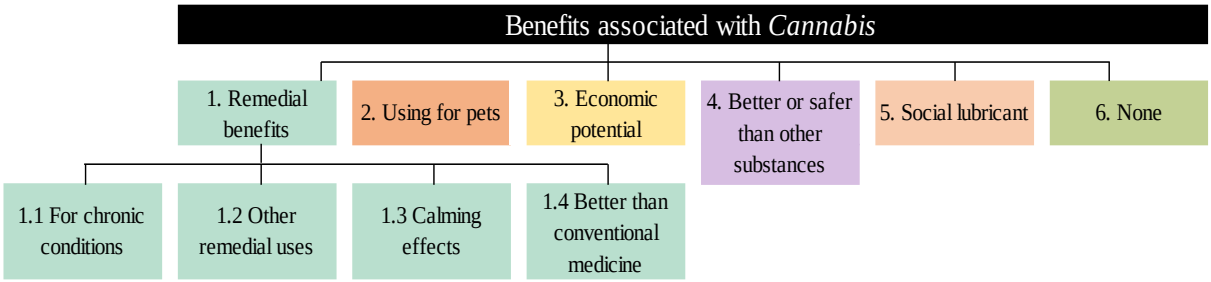

FIGURE 5.3: PARTICIPANT SUBJECTIVE KNOWLEDGE REGARDING BENEFITS ASSOCIATED WITH *CANNABIS.*

The first, most noticeable category that emerged amongst participants was that *Cannabis* "*is used for medicinal purposes*". From the subsequent remedial category, four sub-categories surfaced. The first sub-category was related to *Cannabis* being beneficial in treating or assisting with chronic conditions; "*It helps for depression*", "*arthritis*", "*cancer*", "*Crohn's disease, MS [multiple sclerosis], anxiety*" and "*osteoporosis*", amongst others. Both Pellati et al. (2018) and Iseppi et al. (2019) measured high quantities of beta-myrcene in *C. sativa* (L.) plants which may have analgesic, anxiolytic and anti-inflammatory properties (Baron et al., 2018) which can assist with some relief of the abovementioned chronic and other conditions. One participant also mentioned that "*There are so many testimonies of people who had gone from suffering from epileptic seizures to nothing no more*" with Epidiolex® being the first FDA approved CBD-based medication aimed at treating epilepsy (U.S. Food and Drug administration, 2018). Apart from chronic conditions, participants also mentioned other remedial uses of *Cannabis* forming a second sub-category.

Thus, *Cannabis* assisted with "*aches*" and "*inflammation*" due to its analgesic and anti-inflammatory effects, as reported by Stith et al. (2019). Furthermore, participants mentioned that *Cannabis* assists with "*nausea as a result of chemotherapy*" consonant with studies that are underway that suggest that a combination of THC and CBD might have improved antiemetic effects (Mersiades et al., 2018). Another participant mentioned that *Cannabis* "*strengthens white blood cells or increases white blood cell count*". Stanley et al. (2012) reported that CBD has the ability to influence the migration, survival and death of white blood cells which may prevent or delay the development of cardiovascular diseases.

The third sub-category referred to the calming effects that *Cannabis* elicits. "*Lots of people use it as a stress reliever*" and "*Relaxation… Helps with sleep*", effects that may also be due to the presence of beta-myrcene in *Cannabis*, a compound that is known for its sedative effects (Wang et al., 2019).

Finally, the fourth sub-category emerged from participants stating that *Cannabis* is a better alternative to conventional medicine. Participants mentioned that it is "*Less addictive"* and "*a healthier, more organic way of treating symptoms and illnesses*". One participant also mentioned that conventional medicine were "*giving her [grandmother] stomach ulcers*" and *Cannabis* is "*doing the same as what*

the medication was doing". Even though the long-term effects and interactions with other medication is still largely unknown (Iffland & Grotenhermen, 2017), *Cannabis*, specifically CBD, does have anti-bacterial (Iseppi et al., 2019), immune modulating, anticancer (Cerino et al., 2021), analgesic and anti-inflammatory effects (Stith et al., 2019) which may assist with treating or alleviating certain ailments. Apart from remedial applications in humans, *Cannabis*, specifically CBD, is also used for remedial applications in pets.

The second category amongst benefits associated with *Cannabis* resulted from a participant mentioning that "*We used Cannabis oil for our older dog and it shrunk her tumours a lot*". Currently, CBD products are available and marketed to assist with digestive issues, anxiety, aggression and appetite in pets, specifically cats and dogs (Cannabuddy, 2021; CBD Store, 2021). However, there is limited scientific evidence and regulations regarding CBD products (Greb & Puschner, 2018) and no pet-intended CBD products have been approved by the FDA (American Veterinary Medical Association, 2021). Depending on the country, THC levels in hemp products can range from <0.2% to <1% (Zeremski et al., 2016; Herzog, 2017; Leonard et al., 2020; Sîrbu et al., 2019; Food and Drug Administration, 2020a; Government of Canada, 2020). As cats and dogs have a relatively increased number of cannabinoid receptors, THC toxicity is therefore more likely to occur (Gollakner & Buzhardt, 2021) and this emphasises the vital need for pet owner awareness and education (Greb & Puschner, 2018). Nonetheless, in addition to the medicinal applications in both humans and pets, *Cannabis* may also have other applications with economic potential.

Economic potential was another category that emerged from the benefits associated with *Cannabis*. One participant stated that "*the whole reason for the legislation was that they [the government] want to promote an industry*" with the *Cannabis* Master Plan aimed at increasing *Cannabis* production for export purposes and to gain investment for research within the industry (BusinessTech, 2021a). Furthermore, *Cannabis* "*has huge potential to create jobs and really transform the economy*", with the Department of Agriculture, Land Reform and Rural Development estimating the *Cannabis* industry to be worth R28 billion and able to create around 10,000-25,000 jobs (BusinessTech, 2021b). Finally, there is "*opportunity to develop products that are plastic alternatives*" from hemp, a viable suggestion since *Cannabis* is considered sustainable (Montford & Small, 1999; Musio et al., 2018), cheaper (Schumacher et al., 2020) and does not require extensive use of biocides (Montford & Small, 1999) which can contribute to both food security and sustainability (Schultz et al., 2020). It is evident that both fibre-type and drug-type *Cannabis* would be able to positively contribute to the economy. Another category amongst the benefits associated with *Cannabis* is, however, more applicable to drug-type *Cannabis*.

This category suggested that using *Cannabis* is better or safer than other intoxicating substances. Some participants mentioned that *Cannabis* "*is less dangerous than alcohol*" as alcohol is largely responsible

in cases of "*gender-based violence*" and "*trauma*". Numerous articles report that alcohol abuse largely contributes to the amount of trauma incidents (Maliba, 2020; Chu et al., 2021; Ebrahim, 2021; Makhafola, 2021; Manyoni & Abader, 2021; Nortier, 2021) and gender-based violence cases (Pitpitan et al., 2013; Sonke Gender Justice, 2016; Grobler, 2020; Harrison, 2020). Some studies do suggest that *Cannabis* (THC) use, especially long-term, may also be associated with violence and aggression (Norström & Rossow, 2014; Dellazizzo et al., 2020). However, due to the calming effects associated with CBD, Crippa et al. (2018) suggest that *Cannabis*-induced harms may be controlled with marijuana that contain higher amounts of CBD.

Furthermore, one participant mentioned that *Cannabis* "*never affects the heart and lungs like other drugs*". Cocaine and "crack" cocaine are the drugs most often associated with affecting the heart (American Heart Association, 2015; American Addiction Centers, 2021; Vertava Health, 2021a) and lungs (Restrepo et al., 2007; Nguyen et al., 2007). However, some studies do suggest that marijuana could also have detrimental effects on both the heart (American Heart Association, 2015; Abouk & Adams, 2018; American Addiction Centers, 2021) and lungs (Yogiaveetil & O'Donnell, 2017; National Institute on Drug Abuse, 2020). However, CBD has been shown to have beneficial effects on cardiovascular health (Stanley et al., 2012; Jadoon et al., 2017; Sultan et al., 2017) as well as protecting and improving pulmonary tissue and structure (Salles et al., 2020).

Another category, applicable to recreational marijuana due to its intoxicating effects, emerged due to some participants mentioning that *Cannabis* "*brings people together*". One participant also stated that they "*met some friends, who are still like my best friends now*" as it encourages social engagement. Findings from previous studies found that participants, specifically students and adolescents, used recreational *Cannabis* as it is an effective social lubricant (Dumbili et al., 2020; MacDougall & Maston, 2021).

Finally, there were three participants who could not think of any benefits associated with *Cannabis*, which surfaced as another category. "*I don't know of any good reasons to use it*" and "*I think the risks are more than the benefits*" were the responses from these participants. It is worth mentioning that both participants had limited knowledge regarding *Cannabis.* One participant used *Cannabis* twice with bad experiences and the other participant was opposed to using *Cannabis* completely.

TABLE 5.2: PARTICIPANT SUBJECTIVE KNOWLEDGE REGARDING BENEFITS ASSOCIATED WITH *CANNABIS*

CATEGORY AND/OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. REMEDIAL USE	**1. REMEDIAL USE**	"I recognize the importance of the plants in my reading of literature over the years I've read a lot about traditional healing practices often associated with the words like a shaman" 2 "I definitely think it has its place in the medical world, but I'm not sure if it is actually trialled and tested" 8 "I think the value that can be drawn out of marijuana, as far as healing people, is by far greater than it has been credited for." 12 "I also know that it is used for medicinal purposes, but not sure what purposes exactly." 17 "benefits depends on your reason for using it – if you are using it recreationally there will be more risks than using it medically" 1.6 "I've heard people mention the medical benefits, but I do not have a clue what the benefits are and what the risks are." 2.4	2 – non-user 8 – past user 12 – frequent user 17 – experimental 1.6 – past 2.4 – non-user (n=6)
	1.1 Chronic conditions/illnesses	"It helps for depression" 1 "Some people use it for arthritis" 4 "Medical marijuana used in Parkinson's treatments. Helps with seizures from Parkinson's" 8 "use it for cancer" 10 "There are so many testimonies of people who had gone from people suffering from epileptic seizures to nothing no more… If *Cannabis* was researched just for six months, we would kill COVID and AIDS possibly at the same time." 12 "Other neuron diseases" 13 "Help people managing anxiety… Helps with osteoporosis… Helps with psoriasis" 18 "My one cousin is using the oil – a few drops for cancer, by drinking it. It gave her a relief and did help her." 19 "To be honest, CBD hasn't been part of my training or medical degree – we only heard of the analgesic effects of THC but we haven't been taught about CBD so all I know is from reading it up myself – I do know that it has potential benefits in treating various things like arthritis, Crohn's disease, MS, anxiety" 21 "I have a relative that has cancer and he is on CBD oils and it is used to alleviate pain" 22 "I can't see any other benefits with my knowledge" 25 "one used it for chronic back pain" 2.2	1 – occasional user 4 – experimental 8 – past user 10 – non-user 12 – frequent user 13 – frequent user 18 – occasional user 19 – medicinal user 21 – experimental 2.2 – non-user (n=12)
	1.2 Other remedial uses	"use it for aches" 5 "Helps ease inflammation… Helps with appetite (to create appetite, both THC and CBD) and nausea as a result for chemotherapy" 6 "Rub it on as an ointment" 10 "Friends, family and myself have used it for pain relief" 11 "Suffering from skin conditions to being as clear as a bell… increases your bone-structure density." 12 "Help people in curing whatever their ailment is" 14 "Strengthens white blood cells or increases white blood cell count" 15 "Helps for skin rashes" 19 "In a lower concentration or lower dose the THC can help for nausea" 21	5 – experimental 6 – occasional user 10 – non-user 11 – occasional user 12 – frequent user 14 – non-user 15 – experimental user [hemp seeds, frequent] 19 – medicinal user 21 – experimental user (n=9)

CATEGORY AND/OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
	1.3 Calming effects	"Lots of people use it as a stress reliever" 3 "Relaxation… Helps with sleep" 6 "But what I've seen, it does calm them down and relax them" 8 "A lot of people smoke it to escape life" 17 "…insomnia" 21 "to take the 'edge' off" 22	3 – occasional user 6 – occasional user 8 – past user 17 – experimental user 21 – experimental user 22 – occasional user (n=6)
	1.4. Better or safer than conventional medicine	"Less addictive form to cope with pain, even if it is just psychological, it could prevent people from getting addicted to sleeping pills" 7 "My friends who have used pills for anxiety would experience hair loss or weight loss, but when they use *Cannabis*, they can maintain a normal lifestyle… Pain pills which were giving her (grandmother) stomach ulcers, and the CBD oil doesn't give her stomach ulcers and gives her pain relief… Very good alternative, doing the same as what the medication was doing" 16 "If people can find a healthier, more organic way of treating symptoms and illnesses, that is better" 18 "most patients that use it say that they feel better, they don't want to use a sleeping tablet – they actually sleep better with *Cannabis*" 23 "it is from nature, so I trust it more than pharmaceutical drugs" 2.2	6 – occasional user 16 – experimental user 18 – occasional user 23 – non-user 2.2 – non-user (n=5)
2. PETS		"We used *Cannabis* oil for our older dog and it shrunk her tumours a lot" 16	(n=1)
3. ECONOMIC POTENTIAL		"we used to have this massive hemp industry that was born from these plants that were destroyed due to the negative connotation with THC. I think there's massive opportunity to develop products that are plastic alternatives." 8 "it is already such a huge industry in our country, but it's not currently part of the main economy, more on the black market. It has huge potential to create jobs and really transform the economy, but we're not doing it." 13 "I think the whole reason for the legislation was that they want to promote an industry. They want to create space within the economic sector of South Africa for the *Cannabis* industry, create jobs, and create revenue in the future, because the regulations are very stringent at the moment. But I think they want to create an environment in the future where trade would be possible and where it is regulated." 2.2	(n=3)
4. BETTER OR SAFER THAN OTHER SUBSTANCES		"it is less dangerous than alcohol" 6 "I think compared to alcohol use it is much better – if you go look at stats and news reports and articles – even in South Africa now – we had a big thing during COVID regarding gender-based violence and all the alcohol bans, the numbers on trauma units going down as soon as alcohol is banned." 11 "alcohol is legal and is kind of pushed on people but alcohol results in a lot of road accidents deaths, a lot of gender-based violence, a lot of interpersonal violence… No one has ever died using marijuana, no matter how much you take, it never affects the heart and lungs like other drugs" 13 "I must say, very few – I can count on one hand – who are actually aggressive, would commit a crime or get involved in abusive behaviour" 21 "for pain management, I would see *Cannabis* as an herbal medicine, and it is from nature, so I trust it more than pharmaceutical drugs" 2.2	Mostly referring to THC rather than CBD (n=5)

CATEGORY AND/OR SUB-CATEGORY	QUOTE	REFLECTIVE NOTES
5. SOCIAL LUBRICANT	"I had some deep conversations and I enjoyed that" 6 "met some friends, who are still like my best friends now" 8 "people start using it now to fit in with friends" 11	Mostly referring to THC rather than CBD (n=3)
6. NONE	"I think the risks are more than the benefits" 9 "I don't know of any good reasons to use it" 24 "I can't see any other benefits with my knowledge" 25	9 never used; 24 and 25 experimented but unpleasant experiences (n=3)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

After discussing participant subjective knowledge regarding the benefits associated with *Cannabis*, participants were asked "***What do you think are the risks associated with Cannabis***?". Again, around a half of the participants were not informed as to the different cannabinoids (THC and CBD) and consequently referred to hemp and marijuana as a single entity. In some instances, the risks could be applicable to both THC and CBD but some risks were more commonly associated with THC. Within the risks, eight categories emerged, which included psychological trigger, physiological effects, using *Cannabis* as a treatment instead of seeking professional help, association with criminal activities, *Cannabis* as a gateway drug, underage usage or exposure, lack of validation or verification and ignorance associated with *Cannabis* use. These are illustrated in Figure 5.4 and represented in Table 5.3.

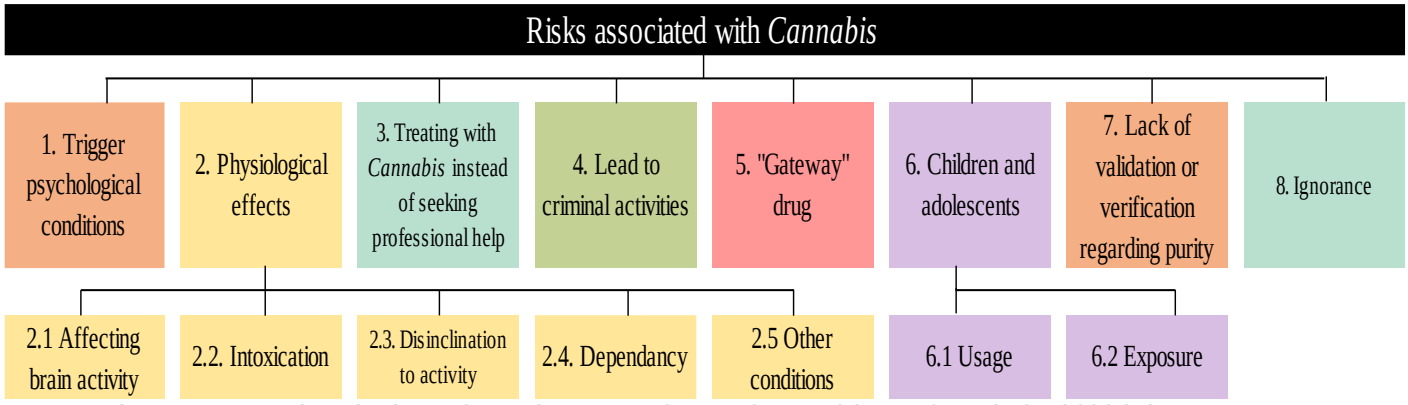

FIGURE 5.4: PARTICIPANT SUBJECTIVE KNOWLEDGE REGARDING RISKS ASSOCIATED WITH *CANNABIS*.

The first category amongst the risks associated with *Cannabis* was the likelihood of *Cannabis* triggering certain psychological conditions. Participants mentioned that "*Certain psychiatric conditions*" include

"*anxiety*", "*permanent substance induced psychosis*" and "*schizophrenia after one dosage if you have the correct gene*". It is worthy to note that two of the participants that contributed to this sub-category, were medical doctors and spoke from personal experience. However, evidence suggests it is THC that triggers these psychiatric disorders (Khan & Akella, 2009; Crippa et al., 2009; Rubino et al., 2012; Krebs et al., 2019; Urits et al., 2020) whereas CBD may assist with alleviating psychiatric conditions (Baron et al., 2018 Stith et al., 2019; Batalla et al., 2021).

Apart from the psychological effects, participants also mentioned physiological effects from using *Cannabis*. This was the most prominent category of the risks mentioned associated with *Cannabis*. There were five sub-categories within this category, viz. effects on the brain, intoxication, a disinclination to activity, dependency and other conditions.

The first sub-category in the physiological effects category is the effect of *Cannabis* on the brain, with some participants mentioning that *Cannabis* "*kills your brain cells*". Several studies and articles, even though inconclusive, report of marijuana use being linked to altering the brain or brain activity, especially in adolescents (Iversen, 2003; Batalla et al., 2013; Battistella et al., 2014; Filbey et al., 2014; Blaszczak-Boxe, 2016; Murray, 2021), and some of the participants spoke from personal experience after consuming THC. On the other hand, CBD has been suggested to have beneficial effects on the brain due to its anti-inflammatory (Stith et al., 2019) and antioxidant (Cheng et al., 2014) properties, while also showing promise in the treatment of mental disorders (Pretzsch et al., 2019; Stith et al., 2019; Batalla et al., 2021).

Another effect that related to the brain, was the intoxicating effects of *Cannabis*, which emerged as another sub-category. Participants stated that *Cannabis* "*affects coordination, driving ability*", "*impedes your inhibitions*" and "*people smoke it to get high*". However, this refers to the intoxicating effects from THC rather than CBD, as CBD produces no psycho-activity (Pavlovic et al., 2019).

Several participants also stated that *Cannabis* may cause a disinclination to activity as it "*can influence your work and day-to-day routine*", "*can make you lazy*" and "*lowers your productivity*", responses that fell under another sub-category within the physiological category. It is also worth noting that two participants had personal experiences with laziness after using *Cannabis*. A disinclination to activity is commonly associated with marijuana but previous studies have yielded disparate results or findings (Maina, 2016) as some suggest that marijuana causes laziness (Hodgekiss, 2013; Tarantola, 2020) while other studies stating the opposite (Ong et al., 2021). In addition, beta-myrcene found in hemp-type *Cannabis* is known to cause sedative effects (Wang et al., 2019) which may be associated with lethargy, idleness and laziness.

The fourth sub-category within the physiological effects referred to dependency as "*it has a high addiction rate*". This was, however, a separate question and the findings of the question is discussed in the next section.

Finally, the fifth sub-category referred to other physiological conditions caused by consuming *Cannabis*. One participant stated that consuming *Cannabis* can lead to "*obesity because you get the munchies*". *Cannabis* is known to increase appetite (Le Strat & Le Foll, 2011; Ngueta et al., 2014; Clark et al., 2018; Greenway & Kirwan, 2019; Sandoiu, 2019), so the assumption would be that it would lead to increased body mass index (BMI). However, some studies suggest that *Cannabis* consumption is associated with reduced BMI (Ngueta et al., 2014; Clark et al., 2018; Sandoiu, 2019). The same participant also mentioned that using *Cannabis* can cause "*glaucoma*". However, *Cannabis* is mostly associated with assisting with the treatment of glaucoma rather than the cause but is strongly advised against by optometrists (Mack & Joy, 2000; Jampel, 2017; University of Utah, 2019; Turbert & Gudgel, 2021). Since *Cannabis* is a plant, it might be perceived as a "natural" remedy in the treatment of all sorts of ailments.

This was another risk associated with *Cannabis*, when may be used to treat ailments as an alternative to seeking medical or professional help. One participant stated that: "*Adults using it as an antidepressant. It has a numbing effect, if I can put it that way, with temporary results. It doesn't solve their problems*". *Cannabis*, especially CBD, has almost become an overnight sensation and seen as a natural, miracle cure which is superior to "synthetic", conventional medicine (Hazekamp, 2018). The FDA has raised concern over people opting to use *Cannabis* to treat their conditions instead of seeking help from professionals (U.S. Food and Drug administration, 2019a). In addition, medical *Cannabis* is mostly still required to be prescribed by a medical professional and distributing *Cannabis* without the necessary documentation or licence is a legal offense in South Africa (Government Gazette, 2020).

Cannabis can be associated with numerous other criminal activities, which was the fourth category amongst risks associated with *Cannabis*. One of the participants mentioned that using *Cannabis* "*leads to increased criminal activity… it is quite a broad risk, it's not only the usage but it is the getting and distribution thereof*". These crimes are not necessarily limited to being under the influence of *Cannabis*, but any misconduct that involves *Cannabis.* Even though *Cannabis* has been decriminalised, the possession of large amounts of *Cannabis* (Molosankwe, 2021), using *Cannabis* in the presence of children, distributing *Cannabis* with or without remuneration (Government Gazette, 2020) and driving while under the influence of *Cannabis* (Grobler, 2018) is not permitted in South Africa and can be seen as criminal activities. *Cannabis* has been legalised in Colorado and Washington for almost ten years (Kang et al., 2016; Hudson Institute, 2019) and consequently, its effect on criminal activities have also been studied. Lu et al. (2019) suggest that legalising recreational *Cannabis* had no effect on crime statistics. However other studies suggest otherwise, implying that the legalisation of *Cannabis* has led to increased illegal activities associated with *Cannabis* such as theft, fraud, assault and even murder (Friedman et al., 2001; Northwest High Intensity Drug Trafficking Area, 2016; Hudson Institute, 2019).

Cannabis is one of the many drugs associated with crime but one of the participants stated that "*all drug addicts start using Cannabis, and from there they progress to more drugs*". This emerged as another category amongst *Cannabis* risks, which is infamously known as a *gateway drug*. In the 1980's, the term *gateway drug* was introduced (Ferguson, 2020) and theorised that the use of certain "soft" drugs (such as alcohol, nicotine and marijuana) would increase the probability of the user transitioning to "hard" drugs (Vertava Health, 2021b). Some studies succeeded in demonstrating the existence of a "gateway drug" (Secades-Villa et al., 2015; Taylor et al., 2017) while other studies have indicated that it is rather environmental and genetic factors would increase the probability of converting to other substances (Williams, 2020). However, there were studies that disproved the existence of "gateway drugs" (Jorgensen & Wells, 2021) with some studies suggesting that *Cannabis* use is a method of harm reduction in terms of substance abuse (Lau et al., 2015; Reiman et al., 2017; Paul et al., 2020). Nevertheless, the term "gateway drug" refers to the effects of THC rather than CBD and adolescents are especially vulnerable to transition to other opioids when exposed prematurely to THC (Williams, 2020).

Underage usage or exposure was another category that emerged amongst the risks associated with *Cannabis*. Two sub-categories were evident within this category. The first sub-category was children and/or adolescents being exposed to *Cannabis* use, "*kids, they see it, and it is like abusing alcohol… children get traumatised by their parents using it*". It is worth mentioning that the participant who made this statement, was not aware of the difference between THC and CBD. Indeed, parents abusing alcohol often leave children vulnerable to behavioural and mental disorders (Raitasalo et al., 2019). However, it is parental marijuana use that has a higher likelihood of leading to psychiatric problems in children (Hiller-Sturmhoefel, 2020) and limited research exists on parental CBD usage and the effects of exposure to children since it does not have an intoxicating effect. Nevertheless, in South Africa, any adult smoking *Cannabis* in the presence of a child (person younger than 18 years) is liable to a fine and/or up to four years in prison (Government Gazette, 2020). Furthermore, paediatricians have raised concerns over accidental ingestion of *Cannabis* amongst children (Wang et al., 2016; Claudet et al., 2017; Patel & Marwaha, 2021) and the potential negative effects of prenatal *Cannabis* exposure is still to be determined (U.S. Food and Drug Administration, 2019b). The World Health Organisation (2016) suggests that such effects may surface later in the child's life and the U.S. Food and Drug Administration (2019b) strongly advises against the use of any *Cannabis* products during pregnancy.

The other sub-category amongst risks involving children refers to children and/or adolescents abusing *Cannabis*. The pathways in the adolescent brain responsible for decision-making, reward system (Bjork et al., 2004; Geier et al., 2010) and the reorganising of endocannabinoids and dopamine (Wahlstrom et al., 2010) are still immature and developing, putting adolescents especially at risk when using *Cannabis* (Johnston et al., 2010). One participant stated that "*withdrawal side effects*" is predominantly due to "*people using it at a young age for a long time and then try to stop using it*". Marijuana use disorder

(MUD) is four to seven times more likely to develop amongst users 18 years and younger compared to adults (Winters & Lee, 2008). Furthermore, another participant mentioned that "*Academically you see it, they [students in school] don't care about things, don't make informed decisions, act impulsively*". Marijuana consumption has been linked with having a detrimental effect on student achievement and attendance (Patte et al., 2017). In addition, adolescents who are struggling academically are more likely to consume marijuana (Henry et al., 2007). In terms of CBD use amongst adolescents, the risks involved are parallel to the risks associated with adults, such as having the potential to slow down brain activity (U.S. Food and Drug administration, 2020c) as well as lack of verification and regulations (Ash, 2019).

Lack of validation or verification regarding retail products was another category that emerged amongst the risks associated with *Cannabis* since "*you don't exactly know what you are actually getting*". Currently, quality assurance methods to assess and verify the purity and CBD content are undetermined (Lachenmeier & Walch, 2020). Intentional or accidental adulteration of heavy metals, pesticides, (Busse et al., 2008), toxic residual solvents (Romano & Hazekamp, 2013), THC (Hazekamp, 2018; Lachenmeier & Walch, 2020) and synthetic cannabinoids (Scutti, 2016; Centers for Disease Control and Prevention, 2018) which may have mild to serious side effects on the user. In addition, claims regarding CBD are not regulated nor verified (Ash, 2019), and urgent need for these regulations are evident. It is also important that the user is informed and aware of dosages and any risks associated with *Cannabis*.

The final category refers to lack of information or knowledge surrounding the use of *Cannabis, which* may have detrimental consequences. Some participants mentioned that "*using it with something else could be a bad risk*" or "*not using it correctly*". Firstly, there is limited evidence on the interaction between CBD and other drugs (Iffland & Grotenhermen, 2017), however CBD is known to interact with the same drugs that interact with grapefruit (Robertson, 2021). Secondly, participants mentioned "*if you don't know how to dose*" and "*Volume and amount you use could be a risk*". Acute intoxication of CBD is possible (Bass & Linz, 2020), however, Zuardi et al. (2006) administered patients with 1,200 mg CBD (equal to two unscheduled/Schedule 0 CBD sales packs) per day and reported no side effects. Side effects of CBD intoxication include slurred speech and vomiting (Bass & Linz, 2020).

TABLE 5.3: PARTICIPANT SUBJECTIVE KNOWLEDGE REGARDING THE RISKS ASSOCIATED WITH *CANNABIS*

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. TRIGGER PSYCHOLOGICAL CONDITIONS		"Certain psychiatric conditions could be triggered by a bad experience" 7 "If you are a nervous person or struggle with anxiety, it could trigger your anxiety" 8 "It could trigger other underlying conditions" 18 "(I've dealt with patients) that suffer from permanent substance induced psychosis (from *Cannabis*)" 21 "It can cause schizophrenia after one dosage if you have the correct gene." 23 "I have a step-sister that uses *Cannabis* for anxiety, but she is bipolar so sometimes, using or smoking it, has a negative impact on her mental health, so it has the opposite effect on her stability." 2.1	(n=6)
2. PHYSIOLOGICAL EFFECTS	**2.1 Affecting brain activity**	"Could be linked to affecting the brain, where it actually caused some damage over time (to the brain) – they could still not prove that as far as I understand, they've tried it with monkeys where they put on masks (on the monkeys) but later realised the research is actually not correct because the monkeys' brain activity got affected due to lack of oxygen and not necessarily *Cannabis*" 6 "There definitely is some truth in *Cannabis* killing brain cells. I used to use *Cannabis* in university every day for 2-3 years and I can definitely feel that I was sharper when I was in school. I could pay attention for longer, I could stay with an issue and work on a problem for longer and now I feel (especially the last two months) I feel I am not on my game – it feels that *Cannabis* could have had an effect on that" 8 "It damages brain cells" 15 "I think it kills your brain cells" 17 "I think you become a bit dumb" 22 "I think it is very bad for your brain – I think it affects your memory and it makes you slow" 1.5	8; 22; 1.5 speaks from personal experience (n=6)
	2.2 Intoxication	"People smoke it to get high and it's like a drug" 4 "Affects coordination, driving ability (driving under the influence would have an affect), red eyes, heart rate could increase excessively – could be a danger for someone with heart problems, paranoia, encourage overeating, slurred speech, sleepy, thirsty or dry mouth" 6 "Impedes your inhibitions" 8 "It inhibits decision making, you don't think as one would in a sober state" 11 "For people who used a higher dosage of THC – it can lead to nausea and vomiting" 21 "you are going to get high" 2.3	(n=6)
	2.3 Disinclination to activity	"It can influence your work and day-to-day routine… It can make you lazy" 1 "It sedates you, makes you feel relaxed and lazy and you do not want to do anything" 8 "Lowers your productivity" 17 "I also think that THC can make people lazy" 1.5	1, 4, 1.5 are *Cannabis* users that experienced laziness (n=4)
	2.4 Withdrawal from addiction	"depression if you stop using it" 1 "withdrawal symptoms" 3 "Essentially you are not craving it, but your body is, your body is not letting you sleep well without it." 8 "Patients who is chronically addicted to smoking *Cannabis*, although I must say it is rare to see those people who suffer from the chronic effects of it… withdrawal side effects could also lead to nausea and vomiting, but to be honest, I haven't seen it that often" 21 "it has a high addiction rate" 1.2 "sometimes you are so dependent on it, you can't function without it" 2.2	(n=6)
	2.5 Other conditions	"It can cause obesity because you get the munchies… Other damage, glaucoma, you get problems with your eyes, you get cataracts and all that kind of stuff."12	(n=3)

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
3. TREATING WITH *CANNABIS* INSTEAD OF SEEKING PROFESSIONAL HELP		"Adults using it as an antidepressant. It has a numbing effect, if I can put it that way – with temporary results. It doesn't solve their problems." 19 "may vary feeling better for a moment or certain time period" 25	
4. LEAD TO CRIMINAL ACTIVITY		"The people get involved with gangs or something" 25 "The other point that comes into play is smoking leads to criminal activity. These guys get smoked up before a robbery takes place. It leads to increased criminal activity, even the illegal growing and selling – it is quite a broad risk, it's not only the usage but it is the getting and distribution thereof." 1.1	(n=2)
5. "GATEWAY" DRUG		"you know all I think all drug addicts start using *Cannabis*, and from there they progress to more drugs" 4 "I think there is some value in the gateway drug interpretation, but not sure if it is necessarily proven… I think that it is very independent on individual, I personally would not. But there are people who have inherently addictive personalities and being inclined to seek out an even better high and even more intense experience and I think that is where the trouble starts." 7 "I think *Cannabis* can be a gateway drug if you are inclined to be an addictive person" 8 "I am scared that today you use a drop, tomorrow is two drops and tomorrow it is other drugs" 10 "It can be a gateway drug to other drugs, so you get hooked on it then you no longer get the high from it and then you go over to other drugs" 16	(n=5)
6. CHILDREN & ADOLESCENTS	**6.1 Usage**	"Most of youngsters and so on will abuse it, so it will just kill brain cells and turn them into goofballs." 12 "Only risk would be that a lot of young people use it too much and they might become unproductive in their lives" 13 "Children abusing it or using it irresponsibly. It affects their behaviour. Academically you see it, they don't care about things, don't make informed decisions, act impulsively, they could be passive and active where they get aggressive." 19 "Withdrawal side effects could also lead to nausea and vomiting, but to be honest, I haven't seen it that often – only people using it at a young age for a long time and then try to stop using it" 21 "you do see the effects on the students… we had an incident at school during this year where a group of Gr. 10 students were tested because they were just acting very strange" 2.1	9; 19; 2.1 Works in educational sector (n=5)
	6.2 Exposure	"I am coming from a children support perspective and educational background, the kids, they see it, and it is like abusing alcohol… children get traumatised by their parents using it" 9	(n=1)
7. LACK OF VALIDATION OR VERIFICATION		"people use it, they go buy it at the taxi rank or wherever and they don't know what they put in it" 1 "every man growing it in their back yard and it is not regulated to be safe for use" 12 "If you are smoking something, you need to know what is inside of it, sometimes it gets mixed with something and it is not solid *Cannabis*" 18 "Usage not regulated like having a plant in your backyard could be quite dangerous" 20 "One of the biggest things is the fact that it is not regulated… you don't exactly know what you are actually getting" 1.4 "You don't actually know how pure the product is that you are buying" 1.5	(n=6)

CATEGORY OR SUB-CATEGORY	QUOTE	REFLECTIVE NOTES
8. IGNORANCE	"An overdose cannot be good" 5 "I think this is quite a big risk area if you don't know how to dose, especially your first time" 8 "I am scared of using it – you don't know how much." 10 "We made it available to the general public, show me the newspaper or pamphlet that shows all the risks of abuse, there is no such document. It was given to the market and you have a complacent general public, only a small amount of people will actually read and understand and do it for the right reasons." 12 "Not knowing how your body would react… In the way you use it, quantity wise could be a risk and mixing other drug-like forms – using it with something else could be a bad risk … Volume and amount you use could be a risk"18 "Not using it correctly – you could possibly use too much… Unregulated use in terms of amount and frequency" 20	(n=6)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

After discussing the risks associated with *Cannabis*, this was followed by asking the question "***Do you think using Cannabis can be habit-forming or addictive?***". Even though similar, for the purpose of this study, some distinction is required between habit-forming and addictive. Addictive refers to being physiologically dependent on a specific substance to function. Habit-forming refers to an established act that is done routinely or regularly, and even though difficult to stop, it is not a physiological dependency. Four categories emerged from this section, where the majority of participants were of the opinion that *Cannabis* is addictive, and some stated that *Cannabis* was habit-forming. Some participants also mentioned that it would depend on the user's personality and finally, some participants did not think *Cannabis* was habit-forming nor addictive. The abovementioned categories are illustrated in Figure 5.5 and participant responses are displayed in Table 5.4.

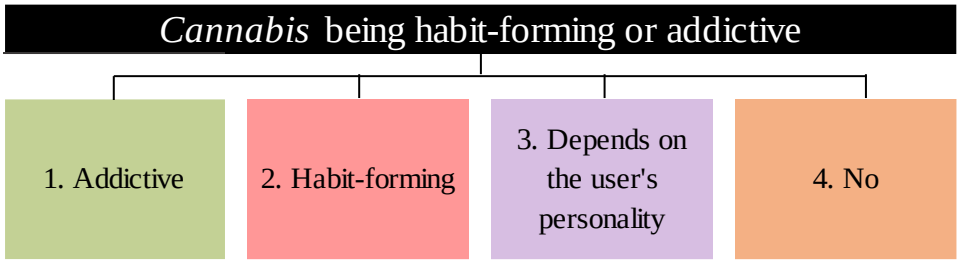

FIGURE 5.5: PARTICIPANT SUBJECTIVE KNOWLEDGE ON *CANNABIS* BEING ADDICTIVE OR HABIT-FORMING.

The first category emerged from participants mentioning that "*I definitely think it can be addictive*", however "*less than alcohol, cocaine and heroin and other drugs on the market*". Indeed, previous studies have shown that individuals have a 26.6 % chance of becoming addicted to alcohol, 15.6% to cocaine and a 9.4% chance to *Cannabis*, specifically marijuana addiction (Flórez-Salamanca et al., 2013). Both adults and adolescents are at risk of developing marijuana use disorder, "*especially if you started using before the age of 18 – you are more likely to become addicted to it*" (Winters & Lee, 2008) with increased detrimental effects (Zehra et al., 2018). One of these effects include withdrawal

symptoms. Marijuana withdrawal would typically include "*your body is not letting you sleep well without it*", "*depression if you stop using it*" as well as irritability, chills, and headaches (Holland, 2019; Crane, 2021). Alternatively, the administration of CBD has the potential to manage withdrawal and substance abuse such as marijuana (Copeland et al., 2015; Shannon & Opila-Lehman, 2015).

The second category surfaced due to participants stating that using *Cannabis* can be habit-forming, referring to a psychological dependency rather than physiological. "*I don't think it is addictive per se, but I think if pain persists, using something like CBD oil, and you use it every day, I can see that that a habit could form eventually*". The habit loop explains that habits are formed through three stages: cue, craving and reward (Duhigg, 2014). For instance, chronic pain would trigger (cue) the user to find means of alleviating the pain (craving), and if using *Cannabis* (CBD oil in this case) would give some form of relief, either physically or psychologically (reward), the user may continue using the CBD oil. Lally et al. (2010) suggested that repeating an action could form a habit within 18 to 254 days and could leave a CBD user psychologically dependent.

The third category referred to whether *Cannabis* is addictive or habit-forming being "*dependent on the person's personality*". Crane (2021) suggests that being disconnected, cautious, apathetic, risk-taking, obsessive and compulsive, such as "*having to start their car three times before driving*" are personality traits more prone to becoming addicted. One participant mentioned that "*there are people who have inherently addictive personalities and being inclined to seek out an even better high and even more intense experience*". However, the concept of an addictive personality cannot be proven as there is no specific personality trait that solely determines addiction (Griffiths, 2016; Raypole, 2019; Katler, 2021). Nonetheless, this category could rather refer to a psychological dependency, or habit-forming, rather than a physiological need or addiction.

Finally, the last category included participants who were of the opinion that *Cannabis* is neither addictive nor habit-forming. Two participants spoke from personal experience "*Personally, I don't find it addictive*" and "*I have no problem not using it for a week or two if I have to not use it*", however, as previously mentioned, these participants only have a 9.4% chance of becoming addicted to *Cannabis*. One participant also stated that "*CBD as far as I know or read, is not addictive*" which is supported by a statement from the World Health Organisation (2017), claiming that CBD does not pose a risk for abuse potential.

TABLE 5.4: PARTICIPANT SUBJECTIVE KNOWLEDGE ON *CANNABIS* BEING ADDICTIVE OR HABIT-FORMING

CATEGORY OR SUB-CATEGORY	QUOTE	REFLECTIVE NOTES
1. ADDICTIVE	"I think any opioid or any stimulant that you use that has a recognisable effect on your body or a perceived effect will, over repeated use over a prolonged period, create cravings for it" 2 "Yes, absolutely – there's a lot of people that say it is not addictive. But after a while, you realise you can't really sleep well without using it. Essentially you are not craving it, but your body is, your body is not letting you sleep well without it." 8 "Yes, I definitely think it can be addictive" 9 "Yes it can, definitely. I do think it is completely blameless, I say this because I had an ex-boyfriend that was highly addicted to marijuana he used very heavily, like 10 times a day. When he tried to quit, he had night sweats and nightmares" 13 "100% yes. I have heard of people who became addicted to it – like any other drug, your brain and body comes reliant on it" 17 "I think, yes – the THC version. I've heard of a friend in his student days smoked a lot of *Cannabis* and in the end he couldn't start his day without having a smoke." 18 "I do believe that, if I look at the situations we deal with on a daily basis with learners that starts to use it. I think it is like nicotine, it is something they get addicted to" 19 "Yes, definitely. I do believe if you use something long enough and in the right or even the wrong circumstances, it can become an addiction." 20 "I think so, yes, THC definitely. Less than alcohol, cocaine and heroin and other drugs on the market... I know THC, after long-term use, is addictive – especially if you started using before the age of 18 – you are more likely to become addicted to it." 21 "I guess so to some extent, but there are so many substances that are probably easier and more accessible and with greater detriment" 22 "Yes I do think so – most of the patients tell me they can't sleep anymore, once they start using it." 23 "There definitely might be a certain addictive component to it" 25	(n=12)
2. HABIT-FORMING	"Yes, I do think it can be habit-forming, because people start relying on the product to get them through the day or for the stress" 3 "Yes, I don't think it is addictive per se, but I think if pain persists, using something like CBD oil, and you use it every day, I can see that that a habit could form eventually. So, I do not think it is addictive, but I do think a habit can be formed." 6 "I don't think it is addictive, but anything can become a habit. It is not like heroin, where your body physically become accustom to and must require it to stay functional, like opioids." 7 "The only one that stands out as habit-forming is the THC... but again, every drug is habit forming" 12	(n=4)
3. DEPENDS ON THE USER'S PERSONALITY	"I think it depends on the personality" 1 "I think that it is very independent on individual, I personally would not. But there are people who have inherently addictive personalities and being inclined to seek out an even better high and even more intense experience and I think that is where the trouble starts." 7 "I think it is definitely dependent on the person's personality because some people are addicts and some people aren't addicts" 13 "I think it depends on you" 15 "I think everything in life can be habit forming. People can be addicted to food, having to start their car three times before driving – I don't think it is the chemical, some people have addictive personalities and some people don't." 16	(n=5)
4. NO	"No, I don't think so " 5 "Personally, I don't find it addictive – it's not as addictive as per se nicotine, caffeine, sugar – I've never had an urge to use it again after I've used it... I don't think using it as a recreational drug it can be that addictive." 11 "I am a frequent *Cannabis* user and I have no problem not using it for a week or two if I have to not use it" 13 "CBD as far as I know or read, is not addictive" 21	(n=4)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.

2.x – participants who have not used *Cannabis.*

5.3.2 Findings of participants' objective knowledge regarding *Cannabis*

The previous section provided insights into the participants' subjective knowledge of *Cannabis* and this section continued a qualitative investigation into participant objective knowledge regarding *Cannabis*. Objective knowledge can be seen as factual knowledge (Kolyesnikova et al., 2008) which can be determined through an impartial assessment (Brucks, 1985). The first question in this section was aimed at exploring what consumers knew about the specific phytochemicals within *Cannabis*: "***What do you know about the chemicals in Cannabis*?**" This question was only asked during the individual interviews. Three categories emerged during the analysis of participant answers; the well-informed participants, the informed participants as well as the uninformed participants. Figure 5.6 illustrates the categories that emerged during this question with the answers presented in Table 5.5.

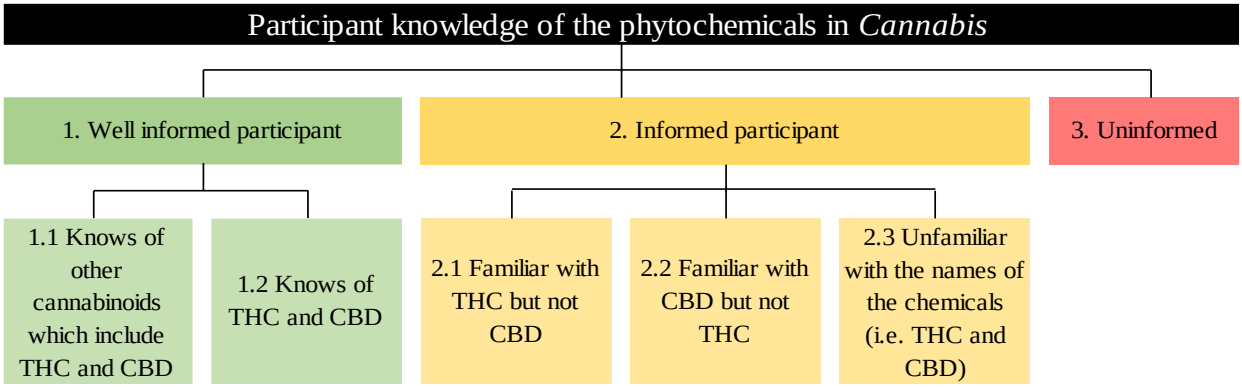

FIGURE 5.6: PARTICIPANT KNOWLEDGE REGARDING THE CHEMICALS IN *CANNABIS*.

Two subcategories emerged from the well-informed participant category. The first subcategory consisted of participants who mentioned THC and CBD belonging to a larger group of chemicals. One participant mentioned that "*there are many cannabinoids*" and the other "*I think over a hundred but I know the two more common ones is the CBD and the THC*". Cannabinol (CBN) was the first phytocannabinoid to be discovered in 1940 (Pertwee, 2006) with close to 120 phytocannabinoids that have been identified since then (Hanuš et al., 2016). The second sub-category included participants who mentioned THC and CBD as the chemicals within the plant. From the well-informed group of participants, only one had not used *Cannabis*.

The second category was the informed participants. One participant mentioned that she "*know(s) of CBD*" where three participants "*only know THC"*, which might indicate that THC is possibly still the cannabinoid that has attracted the most scientific attention (Brenneisen, 2007). One participant was not aware of the nomenclature of THC and CBD but mentioned that "*I know there's a difference between the recreational use, where you get a high and I do know that the medical one with the oils and stuff doesn't have the same chemicals, it's more for pain relief*". From the five participants in this group, only one had not used *Cannabis*.

Finally, there were the uninformed participants that mentioned that they "*have no idea about the chemicals in Cannabis"*. There were three participants from this category who could, later in the interview, identify the difference between THC and CBD. This indicated that these participants were unaware that THC and CBD were chemicals, or more specifically phytochemicals. All three of these participants have used *Cannabis* previously. As anticipated, this category contained the majority of participants who had never used *Cannabis* before.

TABLE 5.5: PARTICIPANT KNOWLEDGE OF THE PHYTOCHEMICALS IN *CANNABIS*

CATEGORY AND/OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. WELL INFORMED PARTICIPANT	1.1 Knows of other cannabinoids which include THC and CBD	"I would just say the actual *Cannabis* plant consist of many *Cannabis* components – I think over a hundred but I know the two more common ones is the CBD and the THC." 6 "There are many cannabinoids or different entities – but the two most common ones are THC and CBD from what I've learned and read and I know there are many more." 21	6 - occasional 21 - experimental (n=2)
	1.2 Knows of THC and CBD	"I know there are two types, not sure if I have the literature right, but the THCA's which requires heat by way of a chemical reaction. So typically you are thinking about smoking or inhalation of *Cannabis*. Then there's also the CBDA's, but the CBDA's I am not too sure about" 2 "I know there is THC and CBD parts" 3 "CBD elicits a calming response. THC is a bit more psychoactive, raises the heart rate and is the main psychoactive component" 7 "THC is what gets you high and CBD has other effects definitely relaxation for the body but has also been proven to help with certain diseases like cancer, Parkinson's, general stress and anxiety etc. whereas THC is the fun part." 13 "I've heard the word 'THC' being used, I've heard of 'CBD', but I don't know what the acronyms are for. " 22	2 - non-user 3- occasional 7 - experimental 13 - frequent 22 - occasional (n=5)
2. INFORMED PARTICIPANT	2.1 Familiar with CBD but not THC	"I don't know too much, I know of CBD." 23	(n=1)
	2.2 Familiar with THC but not CBD	"I only know THC – from what I understand it is the bit that gets you high" 8 "The bad one is the THC – you end up like a goof ball, it is to get the buzz and you go and do your voyager miles." 12 "I think there's THC, but I'm not very educated on that" 16	12 have heard of CBD after this was mentioned 8 Was *Cannabis* user – 1990 | 12 Frequent *Cannabis* user, failed to mention CBD, but did know about CBD | 16 have used *Cannabis* – 1990 (n=3)
	2.3 Unfamiliar with the names of the chemicals (i.e. THC and CBD)	"I know there's a difference between the recreational use, where you get a high and I do know that the medical one with the oils and stuff doesn't have the same chemicals – it's more for pain relief – that's just what I have read" 11	(n=1)

CATEGORY AND/OR SUB-CATEGORY	QUOTE	REFLECTIVE NOTES
3. UNINFORMED PARTICIPANT	"I am not very sure about that" 1 "I have no idea about the chemicals in *Cannabis*" 4 "Nothing" 5 "Absolutely nothing – I know they mix some chemicals with *Cannabis* for an extra kick, but that is only heresy form my high school children" 9 "Nothing" 10 "I don't know the exact chemicals in the plant but I know there's some health benefits to it." 14 "Not a lot, I just know it has an effect on your brain cells" 15 "I do not know anything about it." 17 "Zero – I know nothing" 18 "I don't know – I understand it can be harmful if you misuse it" 19 "Not anything really." 20 "Nothing" 24 "Not the specific chemicals of it, obviously if you extract it and use it, you get the intoxicating effects of *Cannabis* which I am not too familiar with" 25	Some participants (1, 18, 20) were unaware that the chemicals were referring to CBD and THC. These participants did know the difference between THC and CBD. Have used THC once 4 (accidental), 5 (medicinal) or not at all 9,10,14, 20 (n=13)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

After determining the extent of knowledge shown by participants regarding the chemicals in *Cannabis*, participants were asked specifically "***Do you know the difference between Cannabidiol (CBD) and Δ9-Tetrahydrocannabinol (THC)?***" This question was asked in both the individual interviews as well as the focus groups. The individual interviews were more accurate in determining participant objective knowledge regarding THC and CBD since participants were able to rely on each other's answers in the focus groups. This was evident since participants were able to differentiate between CBD and THC in both focus groups. However, there were more participants (60%) who did not know the difference between THC and CBD in the individual interviews. Figure 5.7 illustrates relative proportion (40%) of participants who were able to identify the difference between THC and CBD or who were not able to identify the difference (60%).

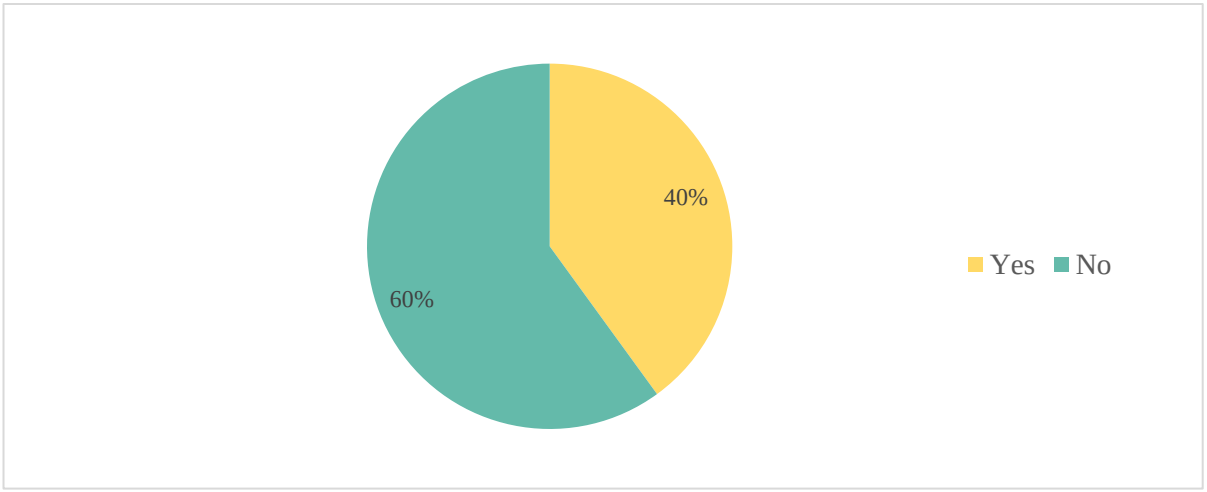

FIGURE 5.7: RELATIVE PROPORTION OF PARTICIPANTS ABLE TO IDENTIFY BETWEEN THC AND CBD.

Concerning *Cannabis* use, participants could be categorised into three groups: those who had each used *Cannabis* four or more times; participants who had used *Cannabis* for experimental reasons (three times

or less), and participants who had not used *Cannabis*. As illustrated in Figure 5.8, it is evident that *Cannabis* users possess greater objective knowledge regarding THC and CBD.

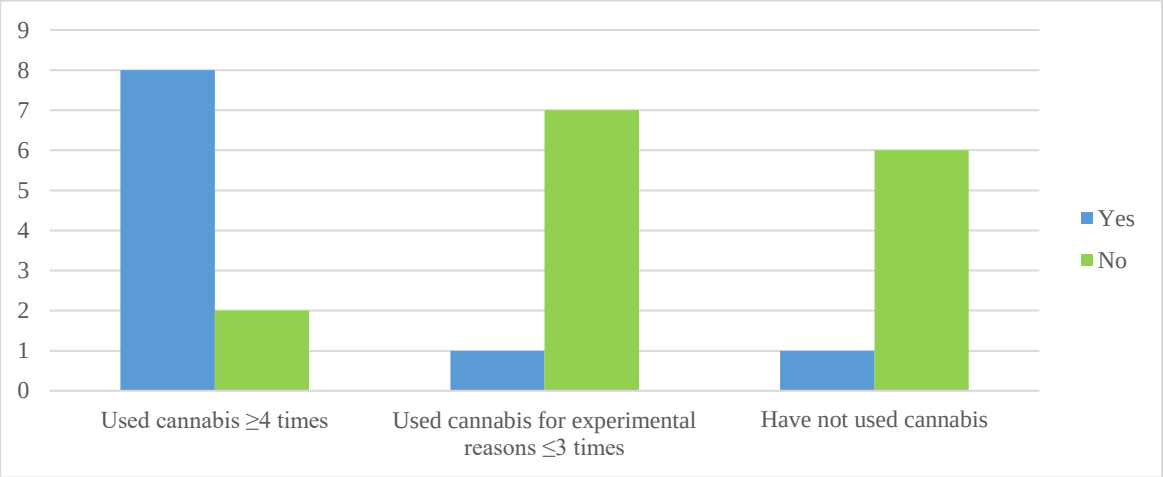

FIGURE 5.8: PARTICIPANTS' OBJECTIVE KNOWLEDGE REGARDING THC AND CBD BASED ON FREQUENCY OF *CANNABIS* USE.

After determining participants' objective knowledge surrounding the phytochemicals in *Cannabis*, the following question focussed on participant objective knowledge regarding the *Cannabis* legislation in South Africa. Participants were asked "***What do you know about the South African law regarding Cannabis?***". Again, the focus groups' objective knowledge was difficult to determine as participants in the focus group were able to rely on answers from other participants. The individual interviews were, however, more accurate and allowed participant responses to be grouped into three categories; participants who were aware of a change in the law; participants who stated *Cannabis* was illegal (or no change in the law), and participants who were not sure. The majority of participants (92%) were aware of a change in the law; another participant (4%) stated that *Cannabis* was illegal, while the remaining participant (4%) was unsure. Figure 5.9 indicates the participants' objective knowledge regarding *Cannabis* legislation in South Africa, in respect of the three categories.

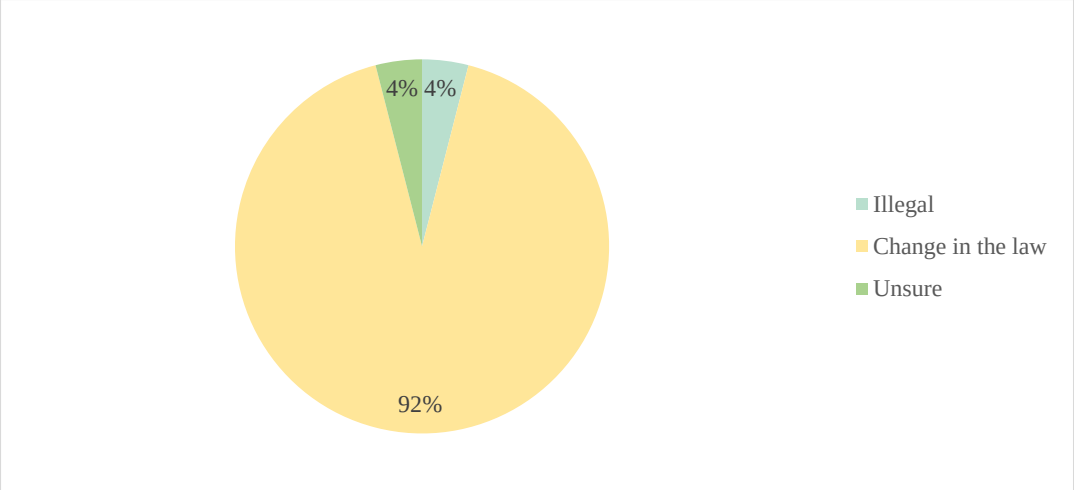

FIGURE 5.9: PARTICIPANT OBJECTIVE KNOWLEDGE REGARDING SOUTH AFRICAN LEGISLATION SURROUNDING *CANNABIS* IN RESPECT OF THE THREE PARTICIPANT CATEGORIES.

Three sub-categories emerged from the "change in the law" category. Almost three quarters (74%) of participants who were aware of a change in the law mentioned that *Cannabis* was legalised for private use or mentioned that *Cannabis* was decriminalised. As previously discussed, decriminalisation typically allows for the use and possession of *Cannabis* for private use but still prohibits commercial sale and distribution (Kowalski, 2016). The remainder of participants stated that *Cannabis* was legalised for medicinal use (9%) while the remaining participants merely stated that *Cannabis* was legalised (17%). According to the Alcohol and Drug Foundation (2021), legalisation includes regulated sale, distribution and production of a drug which is prohibited (BusinessTech, 2021a). Figure 5.10 illustrates participant scope of knowledge (from individual interviews) regarding the change in legislation of *Cannabis*.

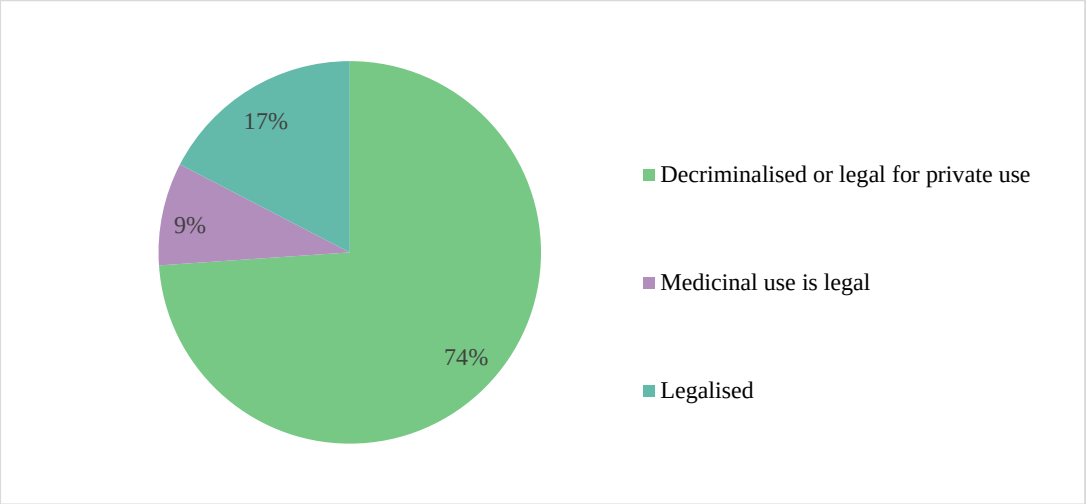

FIGURE 5.10: PARTICIPANT SCOPE OF KNOWLEDGE (FROM INDIVIDUAL INTERVIEWS) REGARDING THE CHANGE IN LEGISLATION SURROUNDING *CANNABIS.*

Five sub-categories emerged from answers to the decriminalised sub-category which were supplemented from both the individual interviews and the focus groups. These sub-categories made reference to the "dagga" couple, dates, grey areas from the first ruling, selling and distribution of *Cannabis* as well as permitted *Cannabis* quantities. The categories and sub-categories that emerged from the question regarding participant objective knowledge regarding the South African *Cannabis* legislation is illustrated in Figure 5.11 and the quotes that generated the categories are presented in Table 5.6.

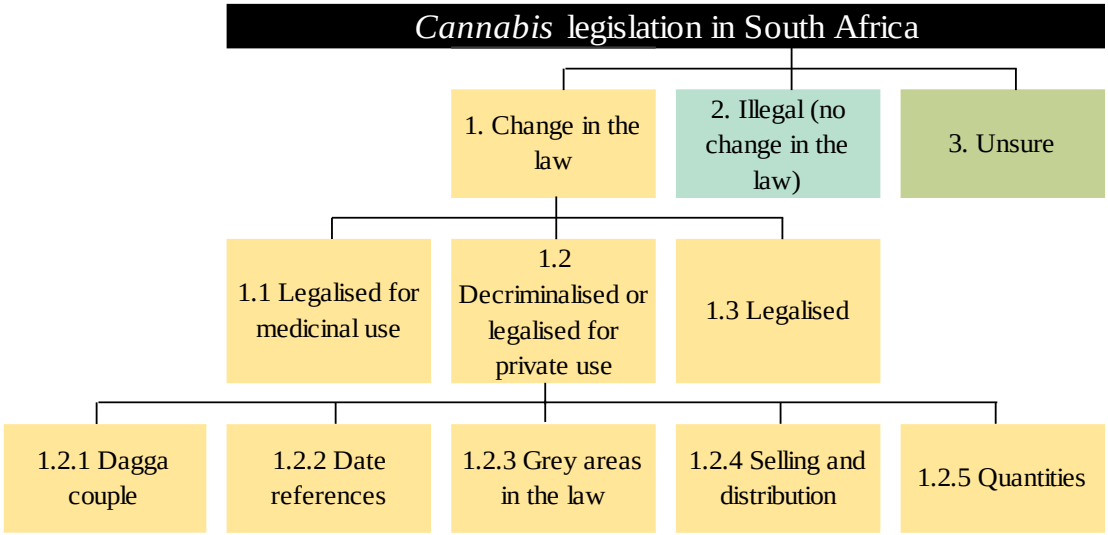

FIGURE 5.11: PARTICIPANT OBJECTIVE KNOWLEDGE REGARDING *CANNABIS* LEGISLATION IN SOUTH AFRICA.

As mentioned, a minority of participants stated that they "*don't know that much about the law exactly*" with only one participant under the impression that "*it is not allowed*". It is also worth mentioning that the participants who fell under this category showed limited overall knowledge regarding *Cannabis*. The majority of participants were able to recall that "*there was a change in the law recently*" and were at least able to identify that "*you are allowed to possess and use Cannabis for personal use*". Some participants were able to recall "*a couple being charged on possession and cultivation of Cannabis*". The couple is known as Julian Stobbs and Myrtle Clarke (de Villiers, 2017) who have "*done a lot of important work*" in terms of *Cannabis* legislation in South Africa. Furthermore, participants mentioned that the *"constitutional court of South Africa had a judgement at the end of 2018*" since prohibition of *Cannabis* violated South Africans' right to privacy (Nel, 2018). However, "*it is very strange legislation, in some cases it is fine and in some cases it is not*" with The *Cannabis* for Private Purposes Bill being passed on 7 August 2020 aimed at providing more clarity in terms of the law (Nkanjeni, 2020). Finally, there were participants who elaborated on the selling and distribution of *Cannabis* "*you are not allowed to trade with it or sell it*" as well as the quantities involved. Some participants could even identify exact quantities "*I think you can carry 100 g*" of dried *Cannabis* in a public space (Government Gazette, 2020) and "*one person… 600 g… if it is more people, I think the limit is 1.2 kg of dried Cannabis*" per dwelling (Government Gazette, 2020).

TABLE 5.6: PARTICIPANT OBJECTIVE KNOWLEDGE REGARDING *CANNABIS* LEGISLATION IN SOUTH AFRICA

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. CHANGE IN THE LAW			
1.1 Legalised for medicinal use		"in our era, it was illegal and you didn't hear or see it, but I think some time ago they did, they changed the law so that you can use it for some medical purposes" 4 "I think the medicinal *Cannabis* is legalised, but only for private consumption" 9 "what I read in the news and for medicinal reasons it is now legalised" 2.4	4;9;2.4 not *Cannabis* users (n=3)
1.2 Decriminalised or legalised for private use	**1.2 Decriminalised or legalised for private use**	"I know you can grow your own weed and you can smoke it but you are not allowed to sell or to distribute it." 1 "You are allowed to possess and use *Cannabis* for personal use" 2 "I know that it is illegal to have it outside of your house or something like that and I know it is fine to grow it in your own home but to take it elsewhere is a problem." 3 "It is allowing South Africans to plant the plant in your own home" 5 "The constitutional court of South Africa had a judgement at the end of 2018… If you ask is it legal in South Africa, yes, private use, possession, cultivate it is legal." 6 "It has been decriminalised and you can grow a certain amount for your own consumption, but you are not allowed to sell it" 7 "I know it is ok to consume it in your own private property" 8 "I think you are allowed to grow your own *Cannabis* in your own home for your own use, provided you're not selling it… The recreational drug I think is still banned for public use… I know using it in public, driving under the influence is still outlawed" 11 "In SA it may be grown for your own personal recreation in your yard – not for sale or re-sale of it." 12 "It is not necessarily legalised, I think it is decriminalised" 13 "You can grow it for your own consumption – so I can plant a plant and then dry it out and use it for myself" 16 "I think initially it was prohibited, but now it is legal… you can plant it in your garden and smoke it and use it in baking" 17 "You can use it at home and grow it for your own use." 18 "I know you are allowed to have some *Cannabis* at your own personal residence, but you're not allowed to take it into public spaces." 20 "So I know it is legalised for private use, so you can use it in your own home for specific purposes… but I know it is not legal to sell *Cannabis* or to use it in public." 21 "I know that you can grow it and consume it on your own property" 22 "the little bit I know is that it's legalised for own consumption" 24 "I think it is legal if you are over the age of 21 but you are not allowed to purchase it, you need to grow it at home" 1.5 "you are allowed to grow it in your garden and you are allowed to use it at home… If you're not the owner of the building/house or garden, you are not allowed to use or grow it there" 2.3	(n=19)
	1.2.1 Dagga couple	"Round about 2018 I remember a couple being charged on possession and cultivation of *Cannabis*" 2 "I think the dagga couple especially have done a lot of important work" 13	(n=2)
	1.2.2 Date references	"I know it was outlawed in the 1920's in South Africa" 2 "It was a couple of months or years ago… I just know about the court case that came into the news." 11 "The constitutional court of South Africa had a judgement at the end of 2018" 6 "I know it changed a year ago or something like that" 16	(n=4)

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
	1.2.3 Grey areas in the law	"I don't think that South Africa knows what the law is." 1 "It was a confusing judgement" 6 "I think it is very unclear at the moment… I think there is still a lot of grey areas in terms of the law" 13 "it is very strange legislation, in some cases it is fine and in some cases it is not." 2.4	*Cannabis* users except for 2.4 (n=4)
	1.2.4 Selling and distribution	"Still cannot sell or walk into a shop and buy it" 6 "I don't know if you can transport it yet" 8 "You're not allowed to sell it, and it must in its original form I think" 9 "You are not allowed to sell it for your own benefit" 15 "but I can't make products and sell it." 16 "If you want to be a distributor, the company must be registered and legalised." 18 "you're not allowed to sell it" 22 "not for mass-produced and sell it – you're going to need a licence for that. So me as a person, I wouldn't be able to grow it in my garden and sell it to my next door neighbour without having some form of a permit" 24 "trading is not legal, I know the other day in the news that somebody, over the weekend, got arrested because they had 40 kg or something in 'dagga' or *Cannabis* that they had in the boot of the car" 2.4 "but you are not allowed to trade with it or sell it" 2.3	(n=10)
	1.2.5 Quantities	"I am not sure about what the quotas are, and the weights are… I am not even sure how much you can grow or how much you can carry" 7 "I am not sure how much grams you can transport" 8 "you are allowed a certain amount, 100g or whatever on your person when travelling" 22 "you are allowed to grow five plants in your garden… At one stage there was a thing where you could have roughly about a matchbox full of *Cannabis* on your person" 1.1 "I think you can carry 100g on you but you are not allowed to smoke it in public." 1.3 ":I think if it is 1 person, it is like 600 g on you but it has to be on your private property/at home. And you are allowed to have five plants, but I think if it is more people, I think the limit is 1.2 kg of dried *Cannabis*." 1.4 "there is a limitation on how many plants you are allowed and how many kilos you are allowed to have on your property or on yourself as a person" 2.4	(n=7)
1.3 Legalised		"I think it's legal." 14 "Consuming *Cannabis* is legal"15 "Well now it's legalised – you can freely use it at this stage and plant your own plants." 23 "if I'm not mistaken, you are now allowed to use it… I just know there was a change in the law recently" 25 "I do recall the court decision that legalized the use of *Cannabis*" 1.1 "And I think they did make it legal to use recreationally" 2.2 "I think it is legal and you can grow it yourself" 2.4	(n=7)
2. ILLEGAL (NO CHANGE IN THE LAW)		"Not much, as far as I'm aware, it is not allowed… I think the medicinal using is just under the radar." 19	(n=1)
3. UNSURE		"Not much" 10 "I am not sure on what level it is allowed for medicinal use" 19 "To be honest, I don't actually know what purposes is outlined in the rules" 21 "I don't know that much about the law exactly" 1.5 "I actually don't really know" 2.1	(n=5)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

5.4 QUALITATIVE FINDINGS REGARDING PARTICIPANT ATTITUDES TOWARD *CANNABIS* (OBJECTIVE 2)

After exploring participant subjective and objective knowledge of *Cannabis*, the next section of the data collection instruments was aimed at participant attitudes (A) toward *Cannabis*. Attitudes can be defined as the behaviour towards people, objects, subjects or situations (Solomon et al., 2006) and are often learnt and formed through experience and/or encounters (Eagly & Chaiken, 2007). As previously discussed, the current research study followed a unidimensional attitudinal structure primarily focussed on attitudes shifting from positive to negative (Samra, 2014).

Four categories emerged from the question "***What is your outlook on or attitude towards Cannabis?***". This question was asked during both the individual interviews as well as the focus groups. There were participants with a definite positive or a definite negative attitude toward *Cannabis*, however some participants were conditionally positive towards *Cannabis*, whilst others were undecided. As discussed in the previous section, some participants viewed *Cannabis* as one entity and were not aware of drug-type and fibre-type *Cannabis*. Based on the previous section, some points mentioned by participants were only applicable to marijuana whilst others could be applicable to both marijuana and hemp. The categories and sub-categories that emerged from the reasoning behind participant attitudes are presented in Figure 5.12 and the frequency of the attitudes are represented in Figure 5.13 with the relevant quotes that generated the categories shown in Table 5.7.

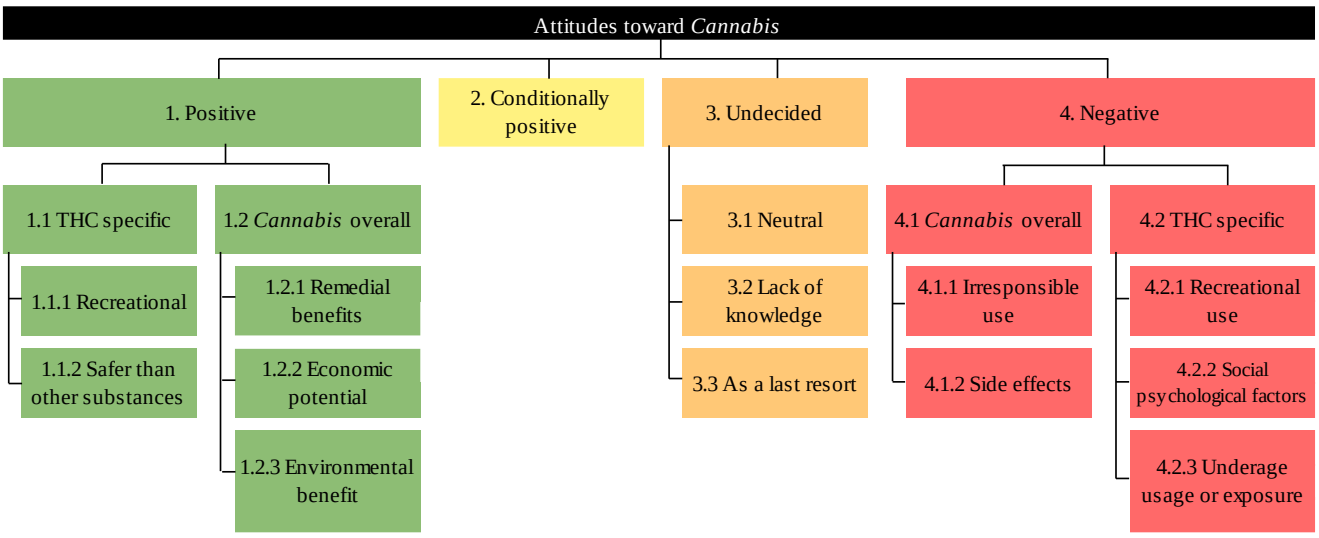

FIGURE 5.12: PARTICIPANT REASONS FOR HAVING SPECIFIC ATTITUDES TOWARD *CANNABIS*.

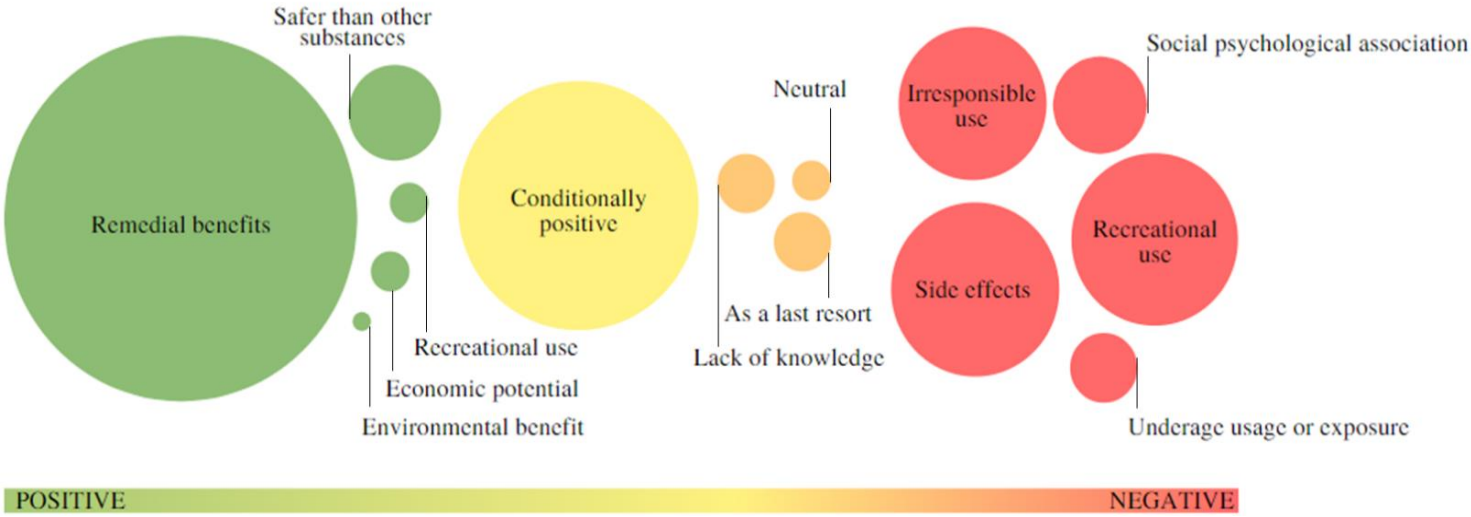

FIGURE 5.13: FREQUENCY SHOWN IN SIZE OF REASON FOR PARTICIPANT ATTITUDE TOWARD *CANNABIS.*

Interestingly, the reasons provided for having positive attitudes toward *Cannabis* were similar to the benefits of *Cannabis* mentioned in the previous knowledge section. High THC-containing *Cannabis* used for recreational purposes was mostly associated with negative attitudes; "*my outlook on recreational use would definitely be negative*". However, there were two participants who had a positive attitude towards using *Cannabis* recreationally, both of whom were experienced (≥ 4 times) *Cannabis* users. Previous studies also indicate that an increased likelihood of recreational *Cannabis* use was associated with positive attitudes (Benson et al., 2020; Zeiger et al., 2020). In addition, a younger age is associated with more favourable attitudes towards recreational *Cannabis* (Keyhani et al., 2018; Dai & Richter, 2019; YorkWilliams et al., 2019; Arora et al., 2020; Zeiger et al., 2020) and both participants were younger than 35 years of age (millennials).

Some participants had positive attitudes towards *Cannabis* (marijuana) as they were of the opinion that *Cannabis* is "*less addictive than other drugs*". Similarly, other studies found that participants and/or respondents felt that substances such as opiates (Sharon et al., 2018; Stillman et al., 2019), alcohol (American Addiction Centers, 2019; Sharon et al., 2018; Stillman et al., 2019), tobacco or nicotine (Sharon et al., 2018; Stillman et al., 2019) and other illicit drugs (Spackman et al., 2017) were more addictive than marijuana. In addition, there were participants who were of the opinion that *Cannabis* "*is not as dangerous*". Similarly, Chang et al. (2019) found that pregnant women who were *Cannabis* users or are using *Cannabis*, perceived other substances as more harmful. Previous studies also indicated that participants were of the opinion that marijuana use is safer than other substances (Allen et al., 2018; Resko et al., 2019). It is worth mentioning that, within these studies, marijuana use was either legalised or decriminalised within the participant demographic regions, a scenario which will be further discussed in this section. Furthermore, all of the participants that contributed to this sub-category were also experienced (≥ 4 times) *Cannabis* users.

Positive attitudes towards *Cannabis* were mainly associated with remedial applications and benefits. Similarly, Resko et al. (2019) and Zeiger et al. (2020) found that participants have evidently more favourable attitudes toward medical *Cannabis* as opposed to using it recreationally. The majority of participants mentioned at least one remedial benefit associated with *Cannabis*, adding to the previous medicinal benefits mentioned in the knowledge section. Correspondingly, previous research shows that participants also had a positive attitude toward the remedial applications related to *Cannabis* (Stillman et al., 2019; Arora et al., 2020; Turna et al., 2020; Chiu et al., 2021).

Participants showed positive attitudes due to three main remedial applications of *Cannabis*. Several participants had positive attitudes toward *Cannabis* for its ability to "*calm you down*" and "*relax you*" with previous studies also suggesting that the participants had positive attitudes due to the calming benefits associated with *Cannabis* (Keyhani et al., 2018; Lucas et al., 2019; Hawley & Gobbo, 2019; Rampold & Telg, 2020). Most participants in the current study had positive attitudes due to *Cannabis* having the ability to treat cancer or "*taking it and reducing their [cancer] symptoms*". Similar studies also indicate that participants were of the opinion that *Cannabis* could potentially assist, in some way, with the treatment of cancer (Hawley & Gobbo, 2019; Rampold & Telg, 2020). Pain relief was the most common remedial benefit mentioned amongst participants in previous studies (Keyhani et al., 2018; Hawley & Gobbo, 2019; Lucas et al., 2019; Rampold & Telg, 2020; Turna et al., 2020; Wheeler et al., 2020). Similarly, current study participants mentioned *Cannabis* having "*analgesic*" properties that could assist those suffering from "*joints that are aching*", "*Crohn's disease*" as well as "*osteoporosis and arthritis*". Figure 5.14 illustrates the distribution of the top three remedial benefits responsible for participant positive attitudes toward *Cannabis*.

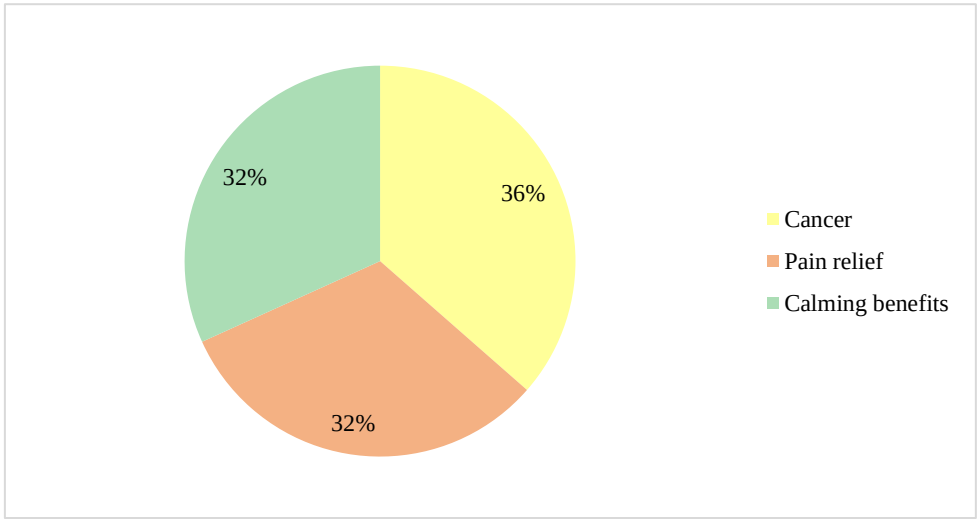

FIGURE 5.14: TOP THREE REMEDIAL BENEFITS ASSOCIATED WITH *CANNABIS.*

There was one participant who showed optimism towards *Cannabis* for its "*potential to create jobs and really transform the economy*". Previous studies have also highlighted participant/respondent enthusiasm towards *Cannabis* being able to add value to the economy (McGinty et al., 2017; Resko et

al., 2019; Rampold & Telg, 2020). In the current study, the same participant and another participant had positive attitudes towards *Cannabis* being "*great for the environment*" with "*massive opportunity to develop products that are plastic alternatives*". Although not predominant, some studies also mention positive attitudes expressed by participants due to potential beneficial contribution to the environment (Resko et al., 2019; Rampold & Telg, 2020). The participants that contributed to these categories were both experienced (≥ 4 times) *Cannabis* users.

The next category was the conditionally positive attitudes that some participants showed toward *Cannabis*. Participants supported *Cannabis* if used responsibly, stating that "*there must be regulations for it*". Interestingly, participants largely referred to "regulated" or similar terms. However, the majority of the participants, who had previously used or are *Cannabis* users, did not obtain their *Cannabis* from a regulated source such as a validated dispensary or medical practitioner. Furthermore, participants that contributed to this category were both users (medicinally and recreationally) and non-users. Using *Cannabis* responsibly from a recreational perspective, participants referred to "*alcohol [which] is regulated*" and users should be "*older than 18 and [able to] understand consequences*". In terms of responsible medicinal use of *Cannabis*, participants referred to "*trained hands*" such as "*a doctor or pharmacy*" and "*they [the government] can regulate it the same way they do other medications*". Participants from previous studies also supported regulated *Cannabis* in both a medical and recreational sense (Karanges et al., 2018; Resko et al., 2019; Amroussia et al., 2020), not only referring to user safety but also to reduce criminal-associated activities (Resko et al., 2019; Rampold & Telg, 2020).

The next category consisted of participants who were ambivalent towards *Cannabis* which contributed towards three sub-categories. The first sub-category consisted of two neutral participants who were "*relatively impartial to it*" and both participants were experienced *Cannabis* users. The second sub-category, participants stated that they are not "*knowledgeable enough*" to have a particular attitude toward *Cannabis*. Similarly, recent studies indicate that participants were also unsure about their feelings toward *Cannabis* due to insufficient knowledge (Luckett et al., 2016; Rampold & Telg, 2020). Finally, the last sub-category emerged due to participants stating that they would consider *Cannabis* "*if you've tried anything and it has failed, more like a last resort*". Participants from previous studies also indicated that they have used non-conventional drugs such as *Cannabis* (Sharon et al., 2018; Bourke et al., 2019) and lysergic acid diethylamide (LSD) (Andersson et al., 2017) for pain management and treating symptoms of epilepsy and cancer in their children (Gibbard et al., 2021) as a last resort.

Finally, the reasons for having a negative attitude towards *Cannabis* were mainly associated with THC rather than CBD. The sub-categories applicable to both CBD and THC were the irresponsible usage associated with *Cannabis* in addition to possible side effects. This category contributes to the earlier mentioned "conditionally positive" category, with participants concerned with *Cannabis* "*coming off the street*" which is "*not regulated to be safe for use*". Negative attitudes toward *Cannabis*, specifically

THC, included its recreational use, social psychological factors as well as underage usage and exposure. The majority of previous studies also found that the popular opinion amongst participants and respondents were not favourable toward recreational *Cannabis* (Martell et al., 2018; Hawley & Gobbo, 2019; Resko et al., 2019; Arora et al., 2020; Chiu et al., 2021). However, when participants in a similar study were split between "liberal" and "conservative" groups, the "liberal" group was evidently more in favour of recreational *Cannabis* than the "conservative" group (Zeiger et al., 2020). The participants that contributed to this category in the current study were largely either non-users or medicinal users and two participants were recreational users, one of whom had an unpleasant experience.

The majority of negative attitudes were due to the possible side effects of *Cannabis*. Participants frequently mentioned "*addictive*" as a side effect, however, some participants also mentioned "*memory loss, or making your brain a little bit slower or triggering anxiety*" and making the user "*lethargic and lazy*". Similarly, previous studies also mentioned concern raised for addiction and negative effects in the brain (Luckett et al., 2016; Keyhani et al., 2018; Resko et al., 2019; Rampold & Telg, 2020). However, Williams et al. (2016) found that Australian respondents had little concern regarding addiction. As mentioned in the previous section, even though both THC and CBD may be associated with lethargy, the other effects such as addiction and side effects on memory and the brain are more commonly associated with THC.

The next sub-category supporting the reasoning behind negative attitudes toward *Cannabis* was the social/psychological association relating to marijuana. Participants referred to taking "*a very conservative stance*", since *Cannabis* has always been a "'*no-no' topic*" and one participant also referred to the "*stigma of the types of people using it*". A survey conducted amongst seven European countries found that *Cannabis*-related stigmatisation was more prevalent in countries with more stringent *Cannabis* legislation (Skliamis et al., 2020). It would, therefore, make sense that *Cannabis* stigmatisation would exist amongst participants since decriminalisation of *Cannabis* only fairly recently occurred in South Africa. It is worth noting that four of the five participants within this group were aged older than 35 (Generation X) and the remaining participant never used *Cannabis*. The legalising of *Cannabis* only occurred fairly recently, when in 2012, Washington and Colorado made headlines as being the first states in the USA to legalise *Cannabis* for recreational use (Hansen et al., 2021). Before then, *Cannabis* has always been mostly considered controversial (Burke & Marx, 1971; Luginbuhl, 2001; Fetherston et al., 2005; Russo, 2007; Paterson, 2009) and the stigma relating to *Cannabis* is associated with a specific age cohort.

Finally, the last reason provided for having a negative attitude toward *Cannabis* involved the risks concerning adolescents and children. Three of the participants in this category worked in the educational sector and could "*see the effects on the students*" as "*they get addicted and it affects their behaviour*". One participant also had a negative attitude due to concern over parents using *Cannabis* in the presence

of minors, "*the kids, they see it, and it is like abusing alcohol*". Similarly, previous studies reported participant concern over adults using *Cannabis* in the presence of minors (Resko et al., 2019) and were of the opinion that second-hand smoke would be unsafe for children (Keyhani et al., 2018). As previously mentioned, it is marijuana use that would rather have a negative impact as CBD usage does not have intoxicating effects. However, second-hand smoke should be considered harmful to children regardless of the active phytocannabinoid.

TABLE 5.7: PARTICIPANT ATTITUDES TOWARD *CANNABIS*

CATEGORY OR SUB-CATEGORY			QUOTE	REFLECTIVE NOTES
1. POSITIVE	**1.1 THC specific**	**1.1.1 Recreational**	"I don't have a problem with it for myself personally. I have used it recreationally for fun… I've never seen someone get aggressive or agitated while using *Cannabis* – they get more into a relaxed state " 11 "in terms of smoking it, if it makes you feel good and doesn't have any health effects or side effects then go for it" 18	11; 18 used *Cannabis* recreationally >4 times (n=2)
		1.1.2 Safer than other substances	"it is less dangerous than alcohol… less addictive than other drugs" 6 "it is not as dangerous… you can look at violent trauma cases and domestic violent cases and most of the causes would be alcohol use." 11 "Positive – I think it is a lot less damaging than alcohol in terms of society, alcohol is legal and is kind of pushed on people but alcohol results in a lot of road accidents deaths, a lot of gender based violence, a lot of interpersonal violence." 13 "I also know of someone who had really bad meningitis that is now using it because all the pills are bad for you"1.4 "my one friend... he will have a joint and sit and work for six to eight hours straight and his mind is very clear… when he has a whisky at night and work for half an hour, the alcohol effect is much worse than the *Cannabis* effect" 1.1	6; 11; 13; 1.4; 1.1 used *Cannabis* recreationally >4 times (n=5)
	1.2 *Cannabis* overall	**1.2.1 Remedial benefits**	"It can calm you down, it can help you with pain… good to relax, relieve pain, help sleep" 6 "I would say it is positive, I have no problem with people using it. There can be definite pain management advantages from it and even people having analgesic experiences from using it." 7 "From a medical perspective I definitely have a positive outlook" 8 "Definitely in medicine, the research is there and the effects it has on people with Parkinson's and cancer patients" 11 "Very pro-*Cannabis* – proper research, properly informed doctors" 12 "It has great applications for people battling cancer, Parkinson's and other neuron diseases" 13 "I do know friends who have had cancer and they use it as a well-being and release and health benefit for that side, so for them, that was a positive." 14 "To help your state of mind or relax you… positive in terms of medical use such as cancer which could help them feel better and I'm for it." 15 "It is positive – I am very pro for: If you have a problem, use whatever is available to fix it. You don't necessarily want to pump toxins into your body with chemo and *Cannabis* will help with that… I know that people with anxiety that use *Cannabis* " 16 "I have a positive outlook on *Cannabis* (both THC and CBD) – I have aunts and uncles who use it for osteoporosis and arthritis" 18 "What I've seen, is that it does help certain individuals, my sister is using it for her skin condition and it certainly does improve her situation." 19 "On the positive side I know of one or two people who have gone through chemo	6; 7; 11; 12; 13; 18; 1.4; 1.2; 1.5; 1.1 used *Cannabis* recreationally >4 times 15; 16 used *Cannabis* recreationally ≤ 3 times 19 uses *Cannabis* medicinally

CATEGORY OR SUB-CATEGORY			QUOTE	REFLECTIVE NOTES
			therapy, anxiety, bad depression and the *Cannabis* oil do help them a lot to find calm in the evenings or if they are super stressed… At the end of the day, if there is something to help them on a long term basis without incurring extreme medical costs – like anxiety is costly to deal with – so if there is a more natural solution, it is good" 20 "The only positive thing is, it does help for the pain. I mean, most patients that use it say that they feel better… they don't want to use a sleeping tablet – they actually sleep better with *Cannabis*." 23 "if used properly it does offer great health benefits… cancer patients who have been successful with taking it and reducing their symptoms" 1.4 "my mom had cancer and she used some CBD oil, whether it helped or not I think depends on the case… personally I think it is good for you" 1.2 "help people with anxiety and PTSD" 1.5 "Having used some of the CBD on joints that are aching, for me personally it seemed to have helped, whether it is a placebo effect or not" 1.1 "if it is used in the medical field to benefit, it is positive" 2.1 "my aunt has Crohn's disease and she uses the oil and it is the only medicine that helps for the pain" 2.5	14; 20; 23; 2.1; 2.5 Never used *Cannabis* (n=19)
		1.2.2 Economic potential	"great application in terms of growing hemp and all of those things… It's not currently part of the main economy, more on the black market. It has huge potential to create jobs and really transform the economy, but we're not doing it." 13	13 uses *Cannabis* recreationally >4 times (n=1)
		1.2.3 Environmental benefit	"We used to have this massive hemp industry that was born from these plants that were destroyed due to the negative connotation with THC. I think there's massive opportunity to develop products that are plastic alternatives… I have read about a lot of products that are plastic now that can be manufactured as a hemp product and be biodegradable." 8 "It's great for the environment" 13	8; 13 used *Cannabis* recreationally ≥4 times (n=2)
2. CONDITIONALLY POSITIVE	**2.1 Responsible use**		"There must be regulations for it. And I think there must be a proper law put out to use it." 1 "I am aware of medicinal properties and I am not against the use of medicinal application in trained hands" 2 "I think if it is studied correctly… it can be used" 4 "If *Cannabis* can be helpful for the right purpose – then I think it is a positive from my side" 5 "If you use it right, it can enhance your life… if you are older than 18 and understand consequences and able to use it the right way" 6 "If I can get it from a doctor or pharmacy if it is prescribed, then I would consider it" 10 "If alcohol is regulated as it is, I don't understand why *Cannabis* isn't regulated as well – especially if it is not as dangerous." 11 "I am pro *Cannabis*, but not pro 'every man growing it in their back yard' and it is not regulated to be safe for use." 12 "If they (the government) can regulate it the same way they do other medications, I think it would be great." 16 "I actually don't really see any negatives – I think you as a person who is using and consuming it, just need to have the knowledge about *Cannabis* and do some research." 18 "I am positive on the one side, but then it must be controlled and guided by a professional and you must stay in that parameters." 19 "Definitely not against it, although – as I say – everything in moderation" 21 "If used correctly, it can be a very good tool" 1.5	1 – user 6 – user 11 – user 18 – user 1.5 – user 12 – medical user 19 – medical user 2 – nonuser 4 – nonuser 5 – nonuser 10 – nonuser 16 – nonuser 21 – nonuser

CATEGORY OR SUB-CATEGORY			QUOTE	REFLECTIVE NOTES
				(n=13)
3. UNDECIDED	**3.1. Neutral**		"If people wants to smoke *Cannabis*, they can do it, there is nothing I can do about it. I won't say I am for it, but I won't say I am against it as well." 1 "I'm relatively impartial to it" 22	(n=2)
	3.2 Lack of knowledge		"I really don't have all the information on the medicinal use of *Cannabis*" 9 "I do not have enough knowledge when it comes to small dosages and using it in maybe medicine purposes" 17 "I don't think I am knowledgeable enough to give my impression of it." 19	(n=3)
	3.3 As a last resort		"If… and I am ailing and that is the cure for my ailment, maybe." 2 "If I am ever in a situation where medically, say with cancer, they say they cannot do anything for you, and people would say consider *Cannabis*… I would consider it" 10 "if you've tried anything and it has failed, more like a last resort." 21	(n=3)
4. NEGATIVE	**4.1 *Cannabis* overall**	**4.1.1 Irresponsible use**	"To me it is a negative thing, especially if it's coming off the street." 10 "not pro every man growing it in their back yard and it is not regulated to be safe for use" 12 "Negative when using it recklessly" 15 "Usage not regulated, like having a plant in your backyard, could be quite dangerous." 20 "So if you use too much of it, if you use it for the wrong reasons… it's obviously it's not going to be good for you." 21 "The patients just don't know how to use it, they just use it to get rid of the feelings they have – they want to get away from the world and that's their escape. So I feel those kind of patients use it in a negative way because they can't regulate themselves." 22 "I've used the oil (THC) which is very unpredictable, I use it for sleep because I sleep quite poorly… but that is not a really controlled dosing method. And I've actually found that it discomforts me, so I've stopped using it completely."1.1 "I think it depends on the user, more than the product itself – because I do think that *Cannabis* has beneficial qualities in certain types of medicine. It can be beneficial, but it can be abused" 2.2	(n=8)
		4.1.2 Side effects	"A negative I would say is that there are some definite physiological changes that happen when you use it and that could be dangerous… If there's some addictive substances to the *Cannabis* itself that could also obviously be a problem." 7 "I think the long term effect is always going to be negative, whether it is a bit of memory loss, or making your brain a little bit slower or triggering anxiety or something like that" 8 "I think you can become addicted to it… I think it makes your brain capacity slower and you are not as productive when you use it." 17 "I do have friends who was addicted and it was extremely hard for them to break that cycle." 20 "you, sort of, become obsessed with using it, then obviously it's not going to be good for you." 21 "you can start using it for medicinal reasons, but then, 'oh it feels nice' and then once you feel a bit down and you also start using it… from a medical and psychiatric point, I've seen too much what it's done to patients. If I take my Rob Ferreira (Hospital) days in the psychiatric unit, 90% of the guys there had *Cannabis* induced psychosis." 22 "it alters your inhibition and obviously because it is addictive, so I can't say it being very good either." 24 "it can also worsen those things (anxiety and PTSD) and make you lethargic and lazy" 1.5 "I think it is dangerous, because it can lead to addiction" 2.2 "I do agree that it can be addictive, because one of my friends actually got addicted to it" 2.5	(n=10)

CATEGORY OR SUB-CATEGORY			QUOTE	REFLECTIVE NOTES
	4.2 THC specific	**4.2.1 Recreational use**	"but for relaxation purposes I would be against that." 2 "I am certainly not pro the so-called recreational view that people have" 12 "My outlook on recreational use would definitely be negative." 8 "I don't smoke at all, marijuana smoking is a negative" 14 "I don't support the recreational use of it – neither children nor adults." 19 "From my side, I don't see myself ever using it as a recreational drug." 24 "I think it's got its bad sides like getting high and all of that" 1.4 "Whether it is a recreational drug, I wouldn't recommend it… coming from my personal point of view, any use of drugs or smoking or anything like that is a negative" 2.3 "I do not see the benefit, if you maybe experience some sort of benefit it might be different, but I cannot imagine that I would attempt to use it. Most definitely negative." 2.4	2 – never used 8 – used, bad experience 12 – medicinal user 14 – never used 19 – medicinal user 1.4 – recreational user 2.3 – never used 2.4 – never used (n=9)
		4.2.2 Social psychological factors	"So I take a very conservative stance" 2 "Growing up, *Cannabis* was classified as a big 'no-no' topic" 4 "because it's been illegal for so long if I know of someone who uses or wants to use it, I don't look down on them, I just don't necessarily agree with them… It's almost like a 'Skommie'" 24 "Negative, just because of the stigma of the types of people using it." 25 "I wasn't raised in a home where using those sort of things are acceptable." 2.3	2 – older than 35 4 – older than 35 24 – older than 35 25 – older than 35 2.3 – never used (n=5)
		4.2.3 Underage usage or exposure	"Definitely negative as I have a negative experience on the abuse on the children's side… the kids, they see it, and it is like abusing alcohol" 9 "But when it comes to the abuse of it, where, for example in my scenario, learners are using it just for the fun of it, where they get addicted and it affects their behaviour – that is where I am very cautious and do not agree that they have to have access to it." 19 "I suppose because I have kids, I would prefer not to smoke anything. So from that perspective, I would prefer them not to know that I enjoy or enjoyed smoking weed in the past" 22 "you do see the effects on the students" 2.1	9;19; 2.1 – in the educational sector (n=4)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

After exploring participant attitudes toward *Cannabis,* the participants were asked the question "***How do you feel about the South African legislation regarding Cannabis?***". This question was asked during both the individual interviews as well as the focus groups. Four categories emerged with participants either supportive of the ruling, ambivalent, opposed to the ruling or had a lack of knowledge. The participants that were supportive of the recent *Cannabis* legislation, stated that "*it is definitely better that it is not illegal anymore*" but other participants felt "*it should be more legal*". Hence, two sub-categories emerged with participants either fully supporting the legislation or stating that it is "*a step in the right direction*" but felt that some improvement and/or clarification was required. Furthermore, some participants were unable to state their feelings toward *Cannabis* as they had a lack of knowledge regarding *Cannabis*. Finally, there were participants who stated that they were ambivalent toward the

ruling. The categories and sub-categories that emerged are illustrated in Figure 5.15 with the relevant quotes shown in Table 5.8.

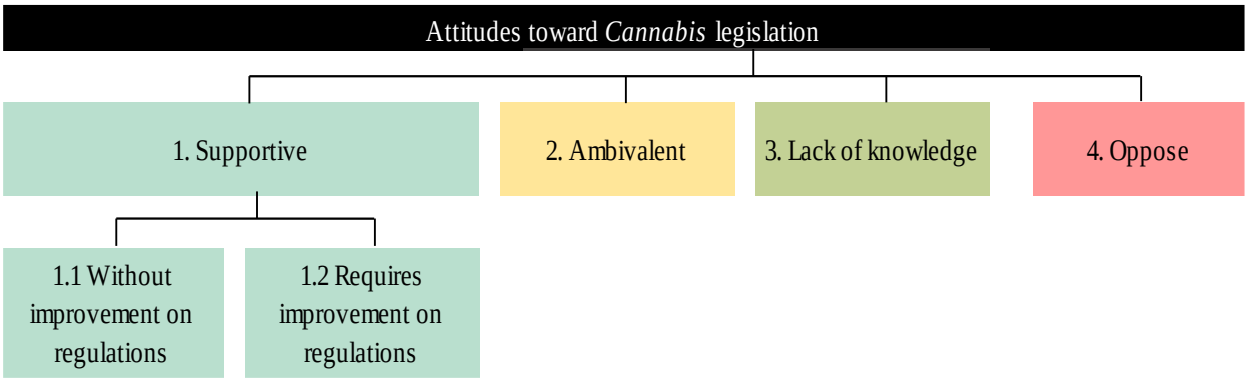

FIGURE 5.15: PARTICIPANT ATTITUDES TOWARD *CANNABIS* LEGISLATION.

Figure 5.16 illustrates the abovementioned categories that surfaced from the individual interviews. Only the data from the individual interviews were used as not all participants answered the question in the focus groups. There were three participants unable to state their feelings toward *Cannabis* as they had a lack of knowledge regarding the *Cannabis* legislation. In addition, two of the three participants who lacked knowledge regarding *Cannabis* legislation were non-users and the remaining participant was older than 35 years. These participants were either not able to answer the question regarding their knowledge of *Cannabis* legislation in the previous section, or answered incorrectly. A minority of participants (8%) were ambivalent toward the ruling.

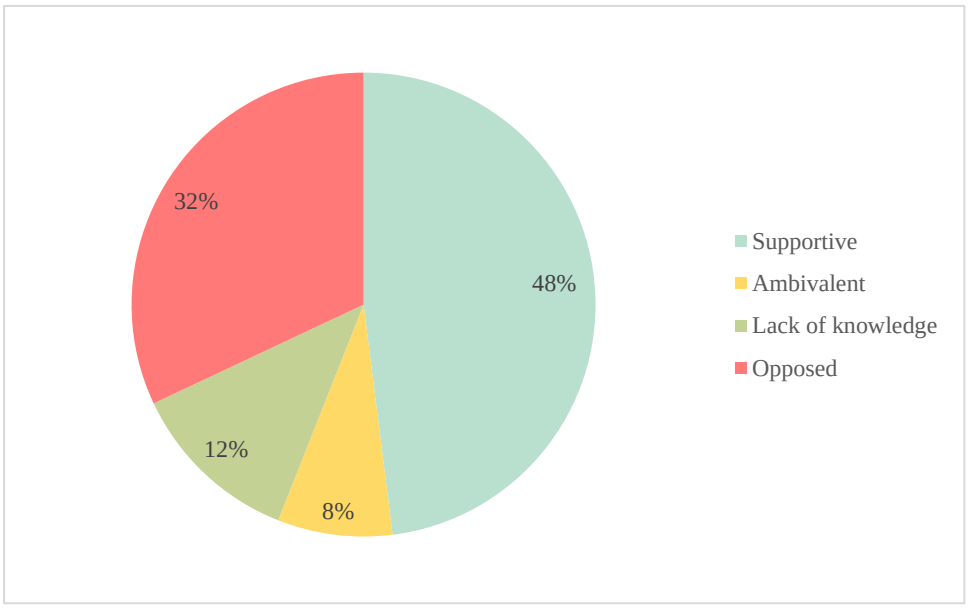

FIGURE 5.16: PARTICIPANT ATTITUDES TOWARD *CANNABIS* LEGISLATION.

Almost half (48%) of the participants supported the ruling of *Cannabis* being decriminalised and about one third (32%) were opposed to the ruling. Even though the sample in the current study is not representative of the general population, it is interesting to compare its results with the results from a recent study where, similarly, 32% of respondents were also opposed to marijuana (Daniller, 2019).

Two years later the same research centre did a similar study and found that only 8% of respondents were completely opposed to marijuana (Schaeffer, 2021). This study furthermore revealed that 60% of respondents supported *Cannabis* legalisation for both medicinal and recreational use and 31% were in favour of legalising *Cannabis* for medicinal use only. These studies, however only surveyed respondent attitudes toward marijuana as opposed to *Cannabis* as a whole. In terms of *Cannabis* in general, Williams et al. (2016) found that, overall, participants were not in favour of legalising *Cannabis* but support for *Cannabis* legalisation was strongly associated with previous *Cannabis* use.

TABLE 5.8: PARTICIPANT ATTITUDES TOWARD *CANNABIS* LEGISLATION

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. SUPPORTIVE	**1.1 Without improvement on regulations**	"it is definitely better that it is not illegal anymore" 7 "I'm all for it… I think this makes people not afraid to use it – it gives it a broader use for the product" 15 "I feel good about it" 18 "I don't think it's a bad choice" 21 "I think it was a good thing that they allowed it, it also sort of reduced the exclusivity of it. It doesn't make it that desirable" 22	7 experimental 15 experimental 18 occasional 21 experimental 22 occasional (n=5)
	1.2 Requires improvement on regulations	"I am more for it than against it… If they can regulate it, then yes, I will be more for it" 1 "I don't see the problem with it being legal everywhere, both THC and CBD" 3 "Definitely a step in the right direction" 6 "might be a couple of steps behind the rest of the world" 11 "I think it should be more legal" 13 "I think it is fine… I wish they [the government] would give people more freedom to apply for licences" 16 "I honestly don't think it is a bad idea… I think that if our government can look at the correct procedures and implement these in such a way that it is regulated" 20	1 occasional 3 occasional 6 occasional 11 occasional 13 frequent 16 experimental 20 non-user (n=7)
2. AMBIVALENT		"No particular feelings" 5 "I feel fine – I don't think it changes anything" 8 "it is a 50-50 for me" 2.3	5 experiment 8 past 2.3 non-user (n=3)
3. LACK OF KNOWLEDGE		"I don't know much about the law" 10 "I don't know enough about it" 14 "I am not sure up to what level they are allowed to use it" 19 "I don't exactly know what the legislation is… I think it is how you use it… for example the students in class, I think that is not a positive regarding the legislation" 2.1	10 non-user 14 non-user 19 medicinal user 2.1 non-user

CATEGORY OR SUB-CATEGORY	QUOTE	REFLECTIVE NOTES
		(n=4)
4. OPPOSED	"You can't have stimulants in the marketplace that are not controlled" 2 "the things that I have heard of *Cannabis* is that it is actually not a good thing" 4 "I think there is still a lot of research they [the government] need to do in the first place" 9 "It wasn't put out for good...You have one of the highest uneducated nations in the world... if it's used incorrectly, the far reaching effects are brain damage" 12 "negative if people are not educated on it... there is a lot of people that are less educated on addiction and drugs" 17 "I feel it shouldn't have been [legalised]" 23 "I don't think it is the greatest thing" 24 "It does make one a bit cautious or scared" 25	2 non-user 4 experimental user 9 non-user 12 frequent user 17 experimental 23 non-user 24 experimental 25 experimental (n=8)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

As presented in Table 5.9, additional findings were identified from responses to this question, with participants reflecting some criticism toward the *Cannabis* legislation. Almost all of the participants had an opinion of how the *Cannabis* legislation should have been introduced, apart from the participants who did not have knowledge regarding legislation or who were in support of the ruling without deeming improvements necessary. It should be noted that during the time that interviews were conducted, the updated *Cannabis* for Private Purposes Bill was only passed about a year earlier, so it may be expected that some participants were not fully informed regarding the exact regulations, such as offenses involving a minor as outlined in the Bill (Government Gazette, 2020). The release of the Bill also did not receive as much media attention as the ruling deeming *Cannabis* as decriminalised, which suggests that news media might be an effective tool to create consumer awareness.

Four categories emerged regarding criticism towards *Cannabis* regulation in South Africa, with the first category consisting of participants who stated that there was improvement required as to current legislation. Some participants also felt that legalising *Cannabis* would improve access to *Cannabis*, which surfaced as a second category. The third category followed from participants mentioning that the current South African law enforcement would not be able to implement the regulations concerning *Cannabis*. Finally, within the fourth category were participants who stated that legalising *Cannabis* does not make sense in a third world country such as South Africa.

The majority of participants felt that there was improvement required as to the current legislation. Interestingly, one participant also mentioned the use of *Cannabis* "*in hostels or communes, places like that. There's no definite legislation for two people living together, one using and one not*". Indeed, there is still a lack of clarity regarding the consumption of *Cannabis* in shared residences. Furthermore, some participants referred to *Cannabis* "*not grown or sold in controlled environments*" such as "*the taxi rank*". Participants mentioned that *Cannabis* "*ought to be controlled through regulation*" as it would be "*safer for people*" since "*you would know what you would be getting*". In this regard, Resko et al. (2019) found that participants felt that regulating *Cannabis* would ensure quality and consequently user safety. As previously mentioned, not all *Cannabis* products may be commercially sold which opens up opportunities for unregulated black-market trading (Mabe, 2012). In addition, some CBD products were removed from the schedule but regulations are lacking in terms of validating the quality of products being sold. Furthermore, in terms of selling *Cannabis*, one participant stated that "*I wish they [the government] would give people more freedom to apply for licences, become a licenced grower and producer of it so that they [Cannabis producers and distributors] can legally do what they are already doing... without the fear of getting caught*". Currently, regarding *Cannabis,* the South African Health Products Regulatory Authority (SAHPRA) only grants licences for medical research purposes (Venter, 2020) and not for the commercial sale or distribution thereof.

The next category referred to the *Cannabis* legislation affecting accessibility toward *Cannabis*. There were two sub-categories within this category. The participants that supported *Cannabis* legalisation stated that *Cannabis* should be fully legalised in order to improve accessibility to *Cannabis*. Participants mentioned that *Cannabis* should be sold "*in pharmacies and shops, so that it is accessible to anyone*" and consequently, "*help a lot of people*" that are "*too scared to get a drug dealer and buy it*". Similarly, other studies also found participants in favour of regulating access to *Cannabis* (Lucas et al., 2019) as this would have benefits to the public (Resko et al., 2019). Alternatively, participants who were opposed to the *Cannabis* legislation stated that legalising *Cannabis* would "*increase the use of it*" with "*people on the streets*" and "*kids at the age of twelve and thirteen smoking it at parties*", which is similar to findings from a recent study amongst Michigan adults (Resko et al., 2019).

Within the next category, participants felt that there was a disregard for law enforcement and "*if you wanted to smoke weed, you're going to smoke weed, whether or not the legislation said you could*". A recent study assessing media articles and news reports from 1995 to 2018 indicated that recurring corruption as well as displays of incompetence and unprofessional behaviour have resulted in a lack of confidence and trust from the public towards the South African Police Service (SAPS) (Motsepe, 2020). It is therefore expected that some participants showed a lack of confidence in the SAPS's ability to enforce *Cannabis* legislation.

Finally, there were some participants who mentioned the change in *Cannabis* legislation did not make sense in a third world country such as South Africa. Participants specifically referred to South Africa being "*one of the highest uneducated nations in the world*", "*a lot of people that is involved in substance abuse*" and having "*much more significant problems*". Indeed, South Africa does have high levels of unemployment and poverty (Bakari, 2017) with one in every five South Africans abusing mind-altering substances (South African Society of Psychiatrists, 2020). However, with the issuing of the *Cannabis* Master Plan (Ramalepe, 2021), an estimated 25,000 jobs would be created, that would attract foreign investment (Burkhardt, 2021) and ultimately improve the economy (Mukeredzi, 2021).

TABLE 5.9: PARTICIPANT CRITICISM TOWARD THE *CANNABIS* LEGISLATION

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. IMPROVEMENT REQUIRED ON CURRENT LEGISLATION		"There must be regulations for it… people use it, they go buy it at the taxi rank or wherever and they don't know what they put in it" 1 "any substance… ought to be controlled through regulation in some or other way" 2 "if you legalise it, it would be – in a way – safer for people that do use it... you would know what you would be getting" 3 "Definitely needs more clarification... a lot of people are still confused as to what it means...regulate it like alcohol... age restriction, not minors so that it is not freely available to everybody" 6 "in hostels or communes, places like that. There's no definite legislation for two people living together, one using and one not, they need to make the legislation clearer" 9 "there is still some loopholes... Are you allowed to take it out and give to your friends – is that supplying or not?... I think it needs to be refined on what you are allowed to do how you can use it." 11 "I am not pharmacist, biologist or zoologist [unqualified], so I am selling stuff with a very high THC level and you do not realise the damage you are doing... It is not controlled, not grown or sold in controlled environments" 12 "I wish they [the government] would give people more freedom to apply for licences, become a licenced grower and producer of it so that they [*Cannabis* producers and distributors] can legally do what they are already doing... without the fear of getting caught" 16 "The consumer needs to know that the product they buy is legit" 18 "implement these in such a way that it is regulated, by maintaining a bit of control over the quantities being sold, the types of locations that it is being sold in" 20 "alcohol is something that you can easily pick up – you can smell it on somebody – it would be easy to do a breathalyser... I would imagine it is a lot more difficult to detect it [*Cannabis*] if someone has used it or is under the influence of it" 24 "One of the biggest things is the fact that it is not regulated, so it is still illegal and if you had to buy some oil at one of these shops now, you don't exactly know what you are actually getting" 1.4 "I do think it can be beneficial if more research is put into it" 2.3	(n=13)
2. ACCESSIBILIT	**2.1 Legalise to improve**	"should be able to sell in pharmacies and shops, so that it is accessible to anyone, anytime" 6 "I think a lot of people use *Cannabis* and if it was so readily available, people wouldn't hesitate to support it." 13 "I know of a lot of people who would benefit from *Cannabis*, but they are too scared to get a drug dealer and buy it. You could make it a bit more accessible without having to go to the doctor and get a prescription for it – I think it would help a lot of people" 16	6, 13, 16 – for *Cannabis* legalisation (n=3)

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
	2.2 Ruling improved access and is disadvantageous	"You've got kids at the age of twelve and thirteen smoking it at parties" 12 "people on the streets that's just using it recreationally and it's just so much easier for them" 23 "I think it is going to increase the use of it and consequently increase the unproductive mind set amongst teenagers" 25	12, 23, 25 – against *Cannabis* legalisation (n=3)
3. DISREGARD FOR LAW ENFORCEMENT		"If you wanted to smoke weed, you're going to smoke weed, whether or not the legislation said you could" 8 "they [the government] don't have the manpower to govern it. They cannot investigate whether people are using or selling it." 9 "I don't think they [*Cannabis* distributors] are getting any grief from the cops" 13 ""it is all about the execution regarding the selling and distribution that becomes a problem." 1.2	(n=4)
4. DOES NOT MAKE SENSE IN A THIRD WORLD COUNTRY		"You have one of the highest uneducated nations in the world… if it's used incorrectly, the far reaching effects are brain damage" 12 "it would be negative if people are not educated on it [*Cannabis*]... I think there is a lot of people that are less educated on addiction and drugs" 17 "in our country, there is a lot of people that is involved in substance abuse, so I was almost surprised that they decided to legalise that, especially in a third world country with much more significant problems" 21 "there is a small percentage that is using it for medicinal reasons, which may be educated enough to not to overdose and not to get psychotic. But we've just got so many uneducated people on the streets " 23 "It is quite premature in our country, especially where the drug use is quite high, I think that a lot of people use it as a recreational drug and not for its medicinal value. Other countries have used it more for medicinal than recreational purposes." 2.3	12, 17, 23 opposed to the ruling. 21 not against the ruling 2.3 Ambivalent towards the ruling (n=5)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

5.5 QUALITATIVE FINDINGS REGARDING PARTICIPANT PERCEPTION/PRACTICE OF *CANNABIS* AND *CANNABIS*-INFUSED SNACK FOODS (OBJECTIVE 3)

Perception and practice are often synonymous in the field of social science (Bargh et al., 1996; Dijksterhuis & van Knippenberg, 1998; Chartrand et al., 2005; Roussel & Frenay, 2019) and can be expressed through other phenomena such as priming (Dijksterhuis & van Knippenberg, 1998) and/or stereotyping (Mortensen et al., 2020). The final section in the data collection instruments focussed on exploring participant perception/practice (P) regarding *Cannabis*. As previously discussed, consumption experience may influence consumer knowledge and attitudes (Valente et al., 1998). Since participant knowledge and attitudes were explored in the previous sections, some additional conclusions could be made regarding participant knowledge-attitude-perception/practice (KAP) of *Cannabis*.

The first question in this section was aimed at establishing whether participants, to the best of their knowledge, have used *Cannabis*: "***Have you ever consumed Cannabis or products infused with***

Cannabis?". This question was asked in both the individual interviews and the focus groups. As can be seen in Figure 5.17, more than two thirds (69%) of participants in the current study had consumed *Cannabis* at least once. Previous studies reported otherwise where the majority of participants never consumed *Cannabis* (Hasan et al., 2019; Hawley & Gobbo et al., 2019; Rampold & Telg, 2020; Chiu et al., 2021) with only one study indicating similar findings to the current study (YorkWilliams et al., 2019). Following on from the participant answers, additional follow-up questions were asked.

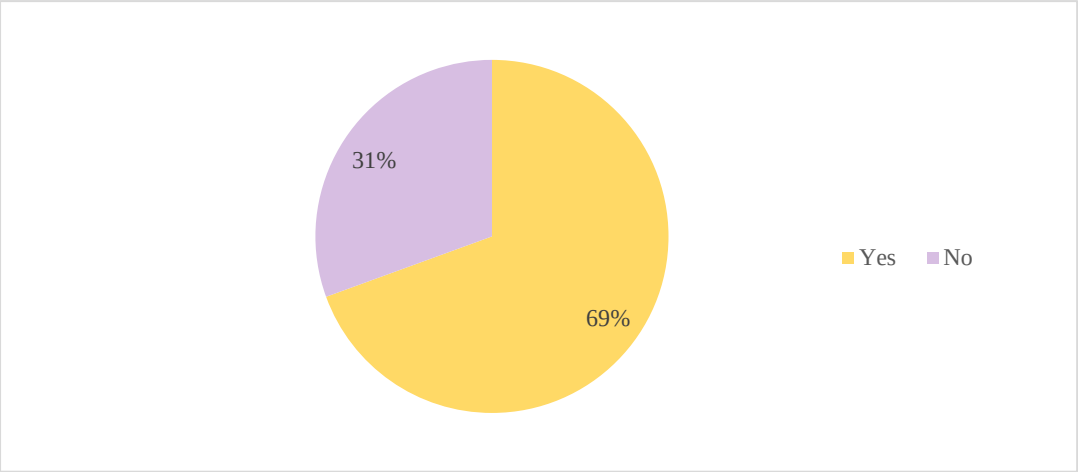

FIGURE 5.17: PROPORTION OF PARTICIPANTS WHO HAVE CONSUMED *CANNABIS* AT LEAST ONCE.

One follow-up question was asked to participants who had not previously consumed *Cannabis*: "***What was the reason for not consuming Cannabis?***". This question was asked in the individual interviews and in the focus group that consisted of participants who had not previously consumed *Cannabis* and generated three categories. The first category was individual-specific and consisted of three sub-categories. Secondly, some participants were concerned at the possible side effects associated with *Cannabis*. Finally, several participants mentioned they didn't have access to *Cannabis* as a reason for not consuming *Cannabis*. The categories that surfaced from this question is shown in Figure 5.18 with the relevant quotes from each category listed in Table 5.10.

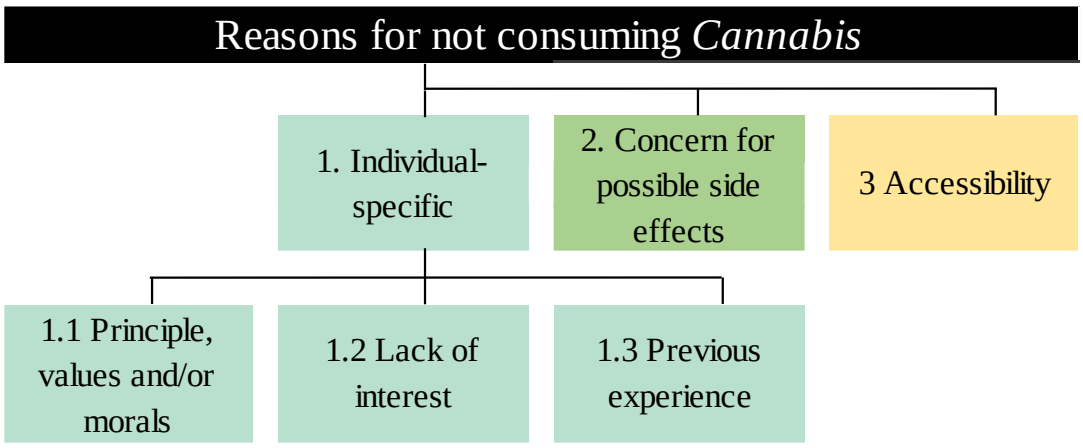

FIGURE 5.18: PARTICIPANT REASONS PROVIDED FOR NOT CONSUMING *CANNABIS.*

The first category emerged from participant individual or personal reasons and had three sub-categories. The first sub-category was based on participant personal principles, values and/or morals. This included statements such as "*the way I was brought up*" and "*it is just not part of my religion*". Previous studies also indicate that religion and upbringing were some of the reasons provided for abstaining from *Cannabis* use (Hathaway et al., 2016; Martz et al., 2018; Hasan et al., 2019).

The second sub-category amongst the individual-specific reasons for not consuming *Cannabis* was due to a lack of interest in doing so. Participants mentioned that they had "*no desire*" to "*trial and test stuff just for the fun of it*". A lack of interest was also a reason given for not consuming *Cannabis* in previous studies (Brandt et al., 2014; Martz et al., 2018). Finally, the last sub-category in the individual-specific category was the connotation of past experiences from participants in terms of substance abuse with one participant who "*grew up in a house with a father that was an alcoholic*".

The next category emerged from participants referring to "*the side effects and the risks involved*" such as "*addiction*", *"being out of control*", getting "*schizophrenia from it [Cannabis]*" as well as "*I don't want my brain to be affected*". The reasons provided for not consuming *Cannabis* were similar to those participants that mentioned in the knowledge and attitude sections regarding the risks involved with consuming *Cannabis*. Similar studies also indicated reasons for abstaining from *Cannabis* that were due to the harmful effects associated with *Cannabis* use (Hathaway et al., 2016; Martz et al., 2018; Hasan et al., 2019). Furthermore, previous studies also indicate that non-users had a higher likelihood to perceive *Cannabis* use as unsafe (Brandt et al., 2014; Andreas & Bretteville-Jensen, 2017; Herruzo et al., 2020; Mariani & Williams, 2021).

Finally, the last category amongst the reasons for abstaining from *Cannabis* use was due to a lack of availability or accessibility. Participants stated that "*you have to look very hard for it [Cannabis]*" and they have "*never been offered it [Cannabis]"*. Since the legislation regarding *Cannabis* has only changed late in 2018 with *Cannabis* being legal for private use (de Villiers, 2018b), its availability is still limited. *Cannabis* consumption is, however, expected to increase as the legalisation of *Cannabis* may influence consumers to perceive it as being more acceptable (Hirst et al., 2017). *Cannabis* usage across the globe, for instance, has increased by about 60% over the past decade (Roth, 2019) as more countries relax their stringent *Cannabis* laws.

TABLE 5.10: PARTICIPANT REASONS PROVIDED FOR NOT CONSUMING *CANNABIS*

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. INDIVIDUAL SPECIFIC	1.1 Principles, values and/or morals	"the way I was brought up, and I suppose because of the existing legislation in the era in which I grew up, dagga was strongly associated with criminal activities and wrong-doing. So I had quite a strong fear and ended up not using it." 2 "It is just not part of my religion, I am against any drug abuse, alcohol abuse because of my Christianity" 9 "I wasn't raised in a home where anyone smoked or used any sort of substance... so I just don't know that sort of thing." 2.3	(n=3)
	1.2 Lack of interest	"I don't trial and test stuff just for the fun of it." 14 "I don't even like smoking so I won't try anything strange and I don't like the feeling of being out of control." 23 "I like being in control and I have no desire to ever even try or attempt to use any of these things" 2.4	(n=3)
	1.3 Previous experience	"I grew up in a house with a father that was an alcoholic – I know that these kind of substances, drug abuse, alcohol abuse – how bad it can be… because of my background I am even scared of alcohol" 10 "I do have friends who was addicted and it was extremely hard for them to break that cycle." 20 "my step-sister used 'dagga' when we were still in school... and I think I've seen the impact on the individual to actually function normally" 2.1	(n=3)
2. CAUTIOUS OF POSSIBLE SIDE EFFECTS		"The side effects and the risks involved." 9 "I am very scared of addiction" 10 "I don't like to be out of control... I don't want my brain to be affected." 20 "I'm just scared for the gene, that I could get schizophrenia from it... it's like smoking, you think it's one cigarette and then when you see again you smoke a packet" 23 "I don't want to feel out of control… I don't want to try something that I can get addicted to" 2.5	(n=5)
3. ACCESSIBILITY		"You don't find them so readily available in South Africa, so you have to look very hard for it." 14 "I've never been offered it." 2.1 "I've never been offered marijuana" 2.3	(n=3)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

The participants who had consumed *Cannabis* were asked additional follow up questions with the first question being: "***What was the reason for consuming Cannabis?***". It should be noted that some of the participants, who had used *Cannabis*, were not necessarily aware of the difference between fibre-type and drug-type *Cannabis*. The interviewer did ask follow-up questions where they were deemed necessary to establish the active component in the *Cannabis* product that participants used. From this question, five categories surfaced: some participants consumed *Cannabis* out of curiosity; accidentally; for therapeutic or recreational applications, or if it were recommended or offered by a trusted source. The categories that surfaced during this question are represented in Figure 5.19 with the relevant quotes from each category shown in Table 5.11.

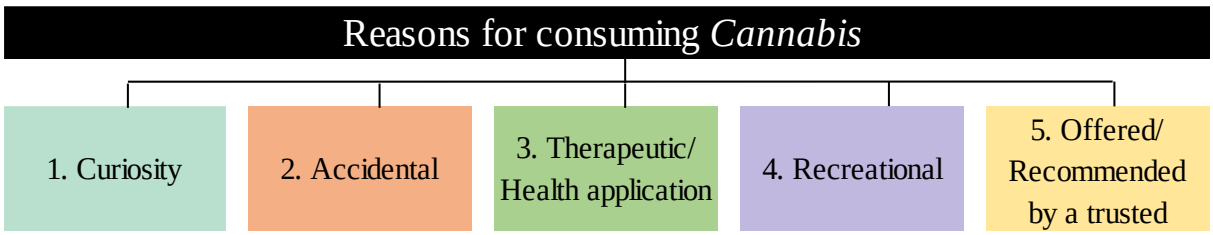

FIGURE 5.19: PARTICIPANT REASONS FOR CONSUMING *CANNABIS.*

The first motive for consuming *Cannabis* was out of "*curiosity*" and "*just to see the effect*". Participants also experimented with both recreational and therapeutic intentions. The curiosity category was also the most frequent reason provided by participants and a few occasional *Cannabis* users also mentioned that they initially experimented with *Cannabis* to see "*what the hype was*". Previous studies also indicate that curiosity and experimentation was a common reason for using *Cannabis* (Lee at al., 2007; Hasan et al., 2019). In addition, three participants also mentioned using *Cannabis* in the Netherlands which, due to being legal for retail has attracted the attention of many tourists (Kuper, 2018).

Accidental *Cannabis* use was another category that emerged amongst the reasons for consuming *Cannabis* as one participant also mentioned that their *Cannabis* use was not intentional, stating that "*I was tricked*". Unintentional *Cannabis* use increased in recent years, especially amongst children (Wang et al., 2016; Claudet et al., 2017; Patel & Marwaha, 2021).

Furthermore, some participants also mentioned that they used *Cannabis* for therapeutic or health reasons, thus providing another reason for consuming *Cannabis*. These participants mentioned that they used *Cannabis* to relieve "*pain*", "*arthritis*" and "*anxiety*" as well as for "*relaxation*" or to "*get to sleep*". The reasons mentioned in this category were similar to those benefits of consuming *Cannabis* as mentioned in the knowledge section. Therapeutic or health applications, a broad field, is one of the most common reasons for consuming *Cannabis* (Lee et al., 2007; Hasan et al., 2019; YorkWilliams et al., 2019; Wheeler et al., 2020).

The next category amongst motives provided for consuming *Cannabis* was to "*enjoy it"* or "*recreational*" reasons. Recreational and enjoyment reasons are a common motivation for consuming *Cannabis* (Lee et al., 2007; Hasan et al., 2019) or to enhance activities such as socialising (Lee et al., 2007; Kolliakou et al., 2015), eating (Lee et al., 2007) or exercising (Lisano et al., 2018; YorkWilliams et al., 2019).

The fifth category amongst the reasons for consuming *Cannabis* was because *Cannabis* was recommended or offered by a trusted source. Participants referred to "*friends*" or "*my sister and other family members*" as trusted sources that recommended *Cannabis*. Some findings from previous studies also indicate that the majority of consumers initially heard of and were willing to try *Cannabis* after hearing from *Cannabis* through friends or family (Cowling, 2020; Giandelone & Luce, 2019).

TABLE 5.11: PARTICIPANT REASONS FOR CONSUMING *CANNABIS*

CATEGORY	QUOTE	REFLECTIVE NOTES
1. CURIOSITY	"experimental" 1 "just for curiosity" 3 "curiosity" 7 "I was in Holland, I thought, what the hell let me try it" 12 "just to see the effect" 15 "I always wanted to try it" 16 "I went to Amsterdam and it was legal there and it is a popular thing to do. Just to see what the hype was about." 17 "I was curious" 18 "to experience what the hype was about" 21 "wanted to see what it would do" 24 "in Amsterdam, I was feeling naughty, being in a different place, doing what everyone was doing" 25	(n=11)
2. ACCIDENTAL	"I was tricked" 4	(n=1)
3. THERAPEUTIC/HEALTH APPLICATION	"for pain" 3 "I've got a bit of arthritis in my right hand." 5 "Relaxation, problems with sleeping." 6 "I took CBD a year ago for pain relief" 11 "or pain management… CBD I take every day in light of COVID so that my immune system is working and not compromised" 12 "it is a de-stresser." 13 "to increase my fibre intake [hemp seeds]" 15 "For my skin rash." 19 "to turn the mind off to get to sleep quicker" 1.1 "I was feeling anxious and it did help with my anxiety" 1.3	(n=10)
4. RECREATIONAL	"Recreation, smoking was my preferred method" 8 "recreation" 11 "I enjoy it" 13 "social gatherings" 22 "it has only been recreationally" 1.5	(n=5)
5. OFFERED/RECOMMENDED BY A TRUSTED SOURCE	"one of my friends said it made them relax" 1 "I got it from someone else" 5 "I was in a friend group who offered it… I felt it was a safe space to try it" 16 "recommended by some sources like my sister and other family members that use it." 19	(n=4)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

After exploring the reasons for consuming *Cannabis,* participants were asked "***What was the method of consuming Cannabis?***". Two categories emerged from this question - participants mentioned that they used *Cannabis* orally, either inhalation or ingesting, or by means of transdermal or topical application. In a survey amongst American respondents, eating and especially smoking (cigarettes and vaping) *Cannabis* were the most popular methods of consumption (Borodovsky et al., 2016). Furthermore, it was evident that the method of consumption was associated with the reason for consumption. However, while not definitive, oral application (except for sublingual administering) was mostly associated with recreational *Cannabis* use whereas transdermal or topical application was mostly associated with medicinal use. The categories and sub-categories that emerged from this question are illustrated in Figure 5.20 with the quotes relevant to each category shown in Table 5.12.

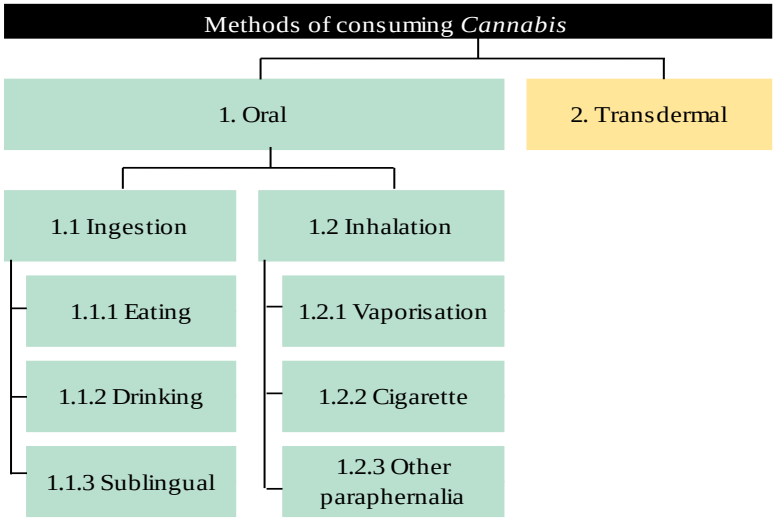

FIGURE 5.20: METHODS OF CONSUMING *CANNABIS*.

The first category that emerged involved the oral methods of consumption with either ingestion or inhalation as sub-categories. Ingestion consisted of three sub-categories where participants either ate, drank or used *Cannabis* sublingually. Eating and drinking products infused with *Cannabis* was largely associated with experimenting or "*trying something new*" and for recreational reasons. Sublingual administration was only used by participants for medicinal or therapeutic applications in the current study.

Eating products infused with *Cannabis*, although not always the preferred method of consumption, has always been a popular consumption method (Borodovsky et al., 2016; Lisano et al., 2018; Borodovsky et al., 2019; Hasan et al., 2019; Knapp et al., 2019; Schauer et al., 2020). Interestingly, in a study conducted amongst young adults in the U.S.A., CBD-infused edibles were the preferred method of consumption (Wheeler et al., 2020). The products eaten that contained *Cannabis* ranged from baked goods such as "*cookies*", "*muffins*", "*brownies*" and "*chocolate eclairs*" to confectionery such as "*CBD-infused chocolate*", "*ice cream*" and "*gummies*". Another study conducted in the U.S. found a correlation between legalising recreational *Cannabis* and an increase in the consumption of different edibles (Borodovsky et al., 2016).

The next sub-category consisted of methods in which *Cannabis* could be drunk. Participants who drank beverages infused with *Cannabis* mentioned "*'dagga' tea*", "*a sugar-free energy drink*" and a "*smoothie*". Even though *Cannabis* tea, also known as *Bhang* in Indian culture, has been consumed over several millennia (Petre, 2019), drinking beverages infused with *Cannabis* is considered to only recently have gained traction amongst consumers (Volpe et al., 2020). Poison City Brewing©, for instance, made headlines for launching the first CBD-infused beer in South Africa (de Villiers, 2018a).

Finally, the last sub-category amongst ingestion involved sublingual methods. Sublingual administering of *Cannabis* was used for therapeutic reasons such as treating pain and to assist with sleeping. Three of the participants that contributed to this category used CBD whilst the remaining participant used THC.

The next oral sub-category was inhaling *Cannabis* which, furthermore, consisted of three sub-categories. The first sub-category was vaporisation, also known as vaping. Vaporisation is performed with a vape, which is an electronic cigarette that produces an inhalable vapour from heated liquid (Lore, 2021). Only two participants mentioned consuming *Cannabis* through a vape but other studies have indicated that vaporisation is one of the most popular methods of smoking *Cannabis* (Borodovsky et al., 2016; Lee et al., 2016; Shiplo et al., 2016; Lisano et al., 2018; Borodovsky et al., 2019; Knapp et al., 2019; Schauer et al., 2020; Zeiger et al., 2021) as it is mainly seen as a healthier alternative to smoking (Shiplo et al., 2016).

The most common inhalation method of *Cannabis* in the current study was smoking *Cannabis* in a cigarette form. Popular slang such as a "*joint*" or "*zol*" were terms commonly referred to by participants. A 'joint' is a cigarette rolled in paper that only contains *Cannabis* (Santos-Longhurst, 2019) and all participants smoked cigarettes that contained marijuana. Participants did not, however, mention other cigarette forms of *Cannabis* such as a 'blunt' or a 'spliff'. 'Blunts' and 'spliffs' are also cigarette forms containing *Cannabis*, however a 'blunt' is rolled in tobacco paper, containing amounts of tobacco, whilst 'spliffs' contain tobacco in the *Cannabis* mixture (Santos-Longhurst, 2019). As with vaping, several studies also indicate that cigarette smoking is a common method of consuming *Cannabis* (Shiplo et al., 2016; Lisano et al., 2018; Hasan et al., 2019; Knapp et al., 2019; Schauer et al., 2020).

The last sub-category amongst inhalation was smoking *Cannabis* with any other form of tool. Participants mentioned smoking *Cannabis* with other paraphernalia such as water pipes, known as a "*bong*" or a "*hubbly*". Recent studies also indicate the prevalence of different types of water pipes used to smoke *Cannabis* (Shiplo et al., 2016; Lisano et al., 2018; Hasan et al., 2019; Swan et al., 2021) but this is a less commonly used method compared with edibles, cigarettes and vaporising. One participant also mentioned smoking "*a type of oil which is called 'dab'*". 'Dabs' are waxy oils that contain high concentrations of phytocannabinoids and is smoked in a special glass water pipe or 'bong' also referred to as an 'oil rig' (Gordon, 2020). Though not common, there are a few studies that indicate the use of 'dabs' amongst participants (Lisano et al., 2018; Schauer et al., 2020) with 'dabs' gaining traction amongst *Cannabis* users (Mullins, 2021).

The final category was the transdermal or topical application of *Cannabis*. As with the sublingual administering, this method was also used in medicinal application. Participants referred to applying "*oil*" or "*ointment*" on "*joints that are aching*" or on a "*hand*" that was ailing. Several studies have indicated that topical application of *Cannabis* (specifically CBD) may have promising outcomes in managing pain and healing wounds (Maida & Corban, 2017; Maida et al., 2020) as well as skin conditions such as pruritus, psoriasis, acne and eczema (Mahmood et al., 2021). Other studies also indicate participant use of other topical products such as bath salts, body balms (Steigerwald et al., 2018) and lotions (Russel et al., 2018).

TABLE 5.12: METHODS OF CONSUMING *CANNABIS*

CATEGORY OR SUB-CATEGORY			QUOTE	REFLECTIVE NOTES
1. ORAL	**1.1 Ingestion**	**1.1.1 Eating**	"eating cookies" 1 "muffins" 4 "I've eaten brownies" 6 "edibles... a cake" 7 "I ate brownies a couple times. I didn't like to do weed brownies, because you actually never knew how much you were going to get." 8 "Homemade 'space cakes'... Rusks, that was good, I couldn't taste the *Cannabis* and still had an effect." 11 "Gummies, chocolate eclairs – infused with CBD, THC or both" 13 "CBD infused chocolate in Amsterdam" 16 "it was a cupcake or brownie" 17 "in butter, milk, ice cream, popcorn" 1.4 "had the cookies... you can get chocolates also made from it [*Cannabis*]" 1.1	(n=11)
		1.1.2 Drinking	"I had 'dagga' tea" 12 "drink infused with *Cannabis*, it was a sugar free energy drink… I made a smoothie that had hemp seeds and hemp seed oils in." 15 "I had a CBD containing smoothie." 21	(n=3)
		1.1.3 Sublingual	"it was a dropper and then you just put a few drops on your tongue" 3 "I took an oil for sleeping" 6 "I take a drop of *Cannabis* oil" 12 "a few drops on your tongue" 18 "oil for sleeping" 1.1	Medicinal application (n=5)
	1.2 Inhalation	**1.2.1 Vaporisation**	"a vape juice" 1 "vaping it" 3	(n=2)
		1.2.2 Cigarette	"smoking a joint" 1 "smoked a joint" 6 "joints… it was my preferred method" 8 "I roll my own joints" 13 "a joint" 18 "smoked a joint" 21 "sharing a joint" 24 "I smoked a 'zol'" 25	(n=8)
		1.2.3 Other paraphernalia	"bongs" 8 "hubbly [water pipe]" 11 "a pipe thingy" 16 "you can smoke a type of oil which is called 'dab'" 1.4	(n=4)
2. TRANSDERMAL			"I used THC oil on my hand" 6 "I rubbed a little bit of oil on [hand]" 5 "CBD oil droplets… on my hand" 11 "As an ointment for a skin rash." 19 "some of the CBD on joints that are aching"1.1	Medicinal application (n=5)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

Following the methods of consuming *Cannabis*, participants were asked about their frequency of *Cannabis* use, "***How often do you consume Cannabis?***". A minority of participants (36%), who had consumed *Cannabis*, mentioned that they only experimented with *Cannabis* (≤3 times). As previously mentioned, the majority of the experimental *Cannabis* users did not know the difference between THC and CBD so it was often unclear as to the active phytochemical and follow-up questions were asked where deemed necessary. Participants who had used *Cannabis* on four or more occasions were categorised as experienced *Cannabis* users. The proportion of experimental and experienced *Cannabis* users are shown in Figure 5.21.

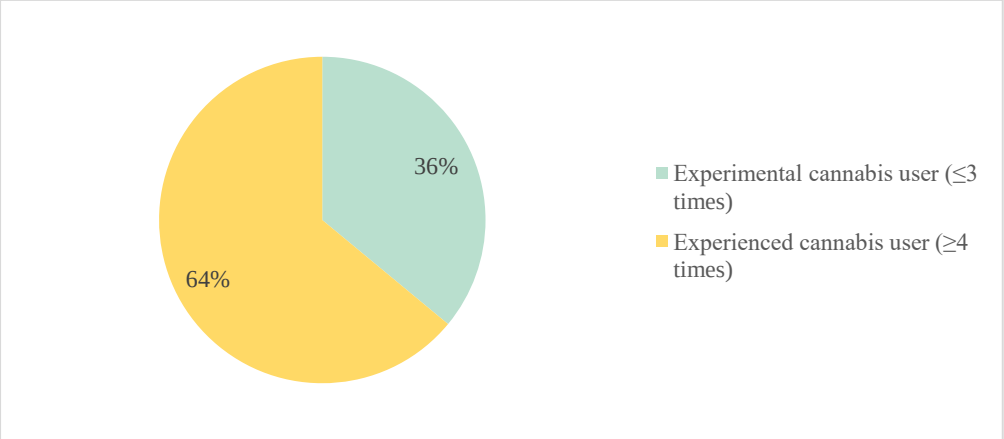

FIGURE 5.21: RELATIVE PROPORTION OF EXPERIMENTAL AND EXPERIENCED *CANNABIS* USERS.

The frequency of *Cannabis* use amongst the experienced *Cannabis* users were then divided into four categories that emerged from participant responses. Firstly, there were participants who completely stopped using *Cannabis* (past user), participants who used *Cannabis* as required, the occasional *Cannabis* user and, finally, the frequent *Cannabis* user. The data that emerged from this question were collected in the individual interviews as well as the focus group that consisted of participants who have used *Cannabis*. In addition, there were some experienced *Cannabis* users (n=4) that only experimented with CBD. Participants discussed their frequency of *Cannabis* use which can be seen in Figure 5.22 with their relevant quotes from the experienced *Cannabis* users shown in Table 5.13.

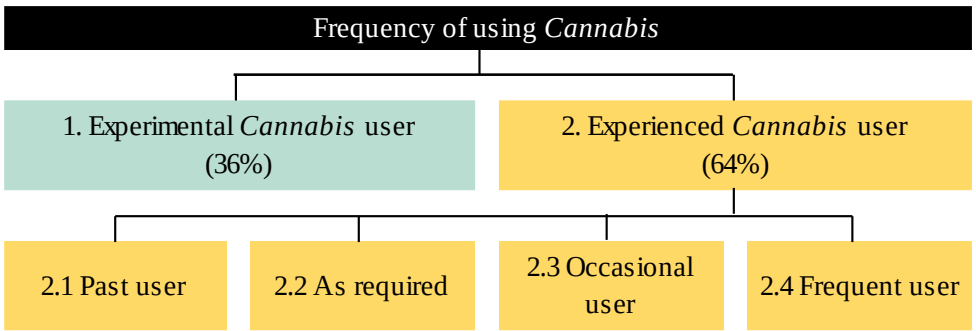

FIGURE 5.22: RELATIVE FREQUENCY OF *CANNABIS* USE BY PARTICIPANT.

The first category consisted of participants who previously used *Cannabis* but had now "*stopped using it [Cannabis]*". Three out of these four participants did so due to side effects while one participant used

Cannabis medicinally, stated that using *Cannabis* (THC) "*does not always work out in the way you plan it*". Two of the participants, one who used marijuana recreationally and one who used marijuana both medicinally and recreationally, stopped using as "*it would make me more anxious*". Both participants used marijuana from a young age ("*in matric*") and mentioned using *Cannabis* "*probably every single day… maybe like 10-12 times*". As mentioned earlier, adolescents are especially at risk when using *Cannabis* (Johnston et al., 2010) in triggering certain psychiatric disorders such as anxiety. This lack of knowledge (K) from participants therefore resulted in irresponsible *Cannabis* use (P) which had a detrimental effect on participant attitudes (A) toward *Cannabis*. The remaining participant used *Cannabis* for pain relief and "*as soon as my hand was fine, I stopped using the CBD oil*".

The next category consisted of participants who use *Cannabis* as required and there was only one participant in this category. The participant stated that "*there are episodes [skin rash] when I use it – then I use it daily until the problem resolves*". Furthermore, the participant in this category did not know the difference between THC and CBD but stated that using the ointment did not have any intoxicating effects. As previously mentioned, CBD has great potential in relieving various skin conditions (Mahmood et al., 2021), so it is likely that this participant was using CBD oil.

The third category consisted of participants who used *Cannabis* "*if the opportunity arises but not on a regular basis*". This was also the largest category from the experienced *Cannabis* user category. Some participants stated that "*it's not my preferred choice for relaxing*" or "*you cannot use THC while trying to study*" as reasons for only using *Cannabis* occasionally. Four participants consumed *Cannabis* more regularly at university but their frequency of use declined once they finished with studies but did not completely stop using *Cannabis*. Research has indicated that people in their early twenties have the highest rate of *Cannabis* use with frequency of use declining with age (Substance Abuse and Mental Health Services Administration, 2016; National Academy of Sciences, 2017; Akbar et al., 2019).

Participants in the last category frequently used *Cannabis* with one participant using *Cannabis* "*once a day*" recreationally. The two remaining participants used *Cannabis* for health applications. One participant used "*CBD every day in the light of COVID*" and the other participant "*found that the hemp seeds really help with digestion*" and "*consume it [hemp seeds] once a month*". It was evident that the participants who frequently consume *Cannabis* had favourable attitudes toward *Cannabis*.

TABLE 5.13: EXPERIENCED PARTICIPANT FREQUENCY OF *CANNABIS* USE

CATEGORY	QUOTE	REFLECTIVE NOTES
1. PAST USER	"I don't smoke at the moment… it started to mess with my anxiety levels and started to trigger some anxiety issues" 8 "CBD I took a couple of years ago - a year or two... as soon as my hand was fine, I stopped using the CBD oil " 11 "For me it is basically to turn the mind off to get to sleep quicker, that does not always work out in the way you plan it. So that is the reason I've stopped using it." 1.1 "I used it for around two years and I smoked probably every single day a couple of times, so	8 and 1.3 were frequent users (n=4)

CATEGORY	QUOTE	REFLECTIVE NOTES
	maybe like 10-12 times... close to the end, it did start becoming a problem where it would make me more anxious, so eventually I had to stop using it" 1.3	
2. AS REQUIRED	"I take THC occasionally for pain management" 12 "At this stage I am not using it, but there are episodes when I use it – then I use it daily until the problem resolves" 19	19 unsure if THC or CBD, but did mention it did not have intoxicating effects (n=2)
3. OCCASIONAL USER	"Once every six months, maybe less" 1 "if the opportunity arises but not on a regular basis" 3 "It's just occasional... I enjoyed it, but it's not my preferred choice for relaxing. I have other options as well, like having wine and good food" 6 "not a lot – once in the last six months" 11 "If it was there at a party and it is around close friends that I trust... but it is not something that I religiously do" 18 "Maybe once every four years, recreationally" 22 "Personally, you cannot use THC while trying to study ... so we don't really use it anymore. But during the holidays, perhaps we will" 1.5 & 1.6 "I don't really use it anymore, so not like every day or once a month, it all depends on the scenario" 1.4	Referring to THC (n=9)
4. FREQUENT USER	"I take CBD every day in the light of COVID" 12 "Once a day" 13 "I am a diabetic and struggle with digestion so experiment with different snacks – so I found that the hemp seeds really help with digestion. I'd add it to granola or yoghurt – I consume it once a month" 15	(n=3)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

The following question explored how participants determined the dosing of *Cannabis*. Participants were asked: "***Did you know how to use the Cannabis, and if so, how did you go about with determining the dosage?***". Participant responses were grouped into two categories as to having a method of dosing or not. In the previous section, *Cannabis*-using participants were grouped into five categories: experimental user; previous user; use as required; occasional user, and frequent user. Figure 5.23 shows the different types of *Cannabis* users' methods of dosing with the vast majority of participants not having a *Cannabis* dosing method. Furthermore, the non-frequent (i.e. 'experimental' and 'occasional') *Cannabis* users were more likely not to calculate the amount of *Cannabis* they used compared to the frequent *Cannabis* users. There was only one participant who used *Cannabis* as required and she used some form of dosing method. Figure 5.23 contains data from all forms of *Cannabis* use as mentioned by participants so if a participant fell within the category of experienced user of marijuana, but experimented with CBD, the dosing methods of both instances and user types were included.

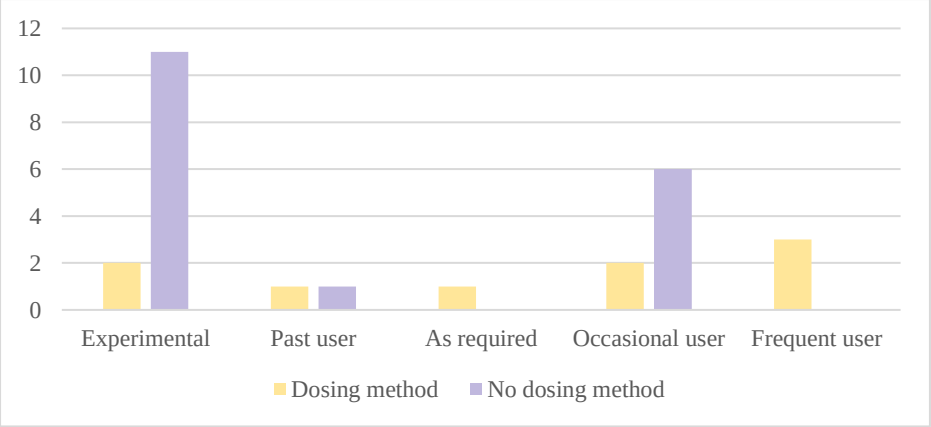

FIGURE 5.23: DIFFERENT TYPES OF *CANNABIS* USERS' METHODS OF DOSING.

Each of the abovementioned categories had three sub-categories which are shown in Figure 5.24 and the quotes relevant to each sub-category are presented in Table 5.14.

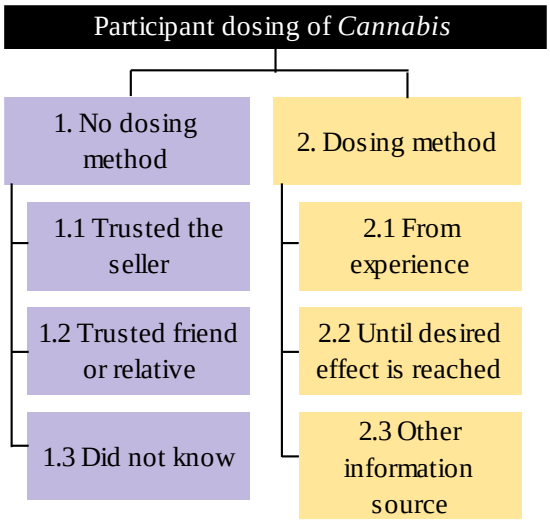

FIGURE 5.24: PARTICIPANT DOSING OF *CANNABIS*.

Dosing of *Cannabis* depends on various factors such as individual internal physiological environment, body weight, delivery method as well as the amount and type of *Cannabis* used in the finished product (Ferguson, 2019; Weil, 2021). The active phytocannabinoids are often measured in milligrams and about 35 mg of THC, for instance, could be the difference between a pleasant and an unpleasant experience (Sulak, 2020). However, since the selling and distribution of marijuana remains illegal in South Africa (Government Gazette, 2020) and claims on CBD products are currently unregulated and unverified (Ash, 2019), it is often difficult to determine an accurate dosag protocole. This would explain why the majority of participants did not measure the amount of *Cannabis*, a result which is similar to those from previous studies (Wheeler et al., 2020; Giandelone & Luce, 2019).

The no-dosing category had three sub-categories. The first sub-category consisted of participants who trusted the seller of the *Cannabis* or *Cannabis* product. All of the participants within this sub-category

used *Cannabis* for experimental reasons and mentioned they bought "*a finished product*" from "*a bar*" with one participant even mentioning they "*bought it [THC 'joint'] from somebody in a parking lot*". Secondly, the majority of participants dosed based on the recommendation of a trusted source such as "*family members*" or "*a friend, who had more experience*". As previously mentioned, this category consisted largely of experimental and occasional *Cannabis* users. Previous studies show similar findings with friends and family being the most common source of *Cannabis* information (Cowling, 2020; Giandelone & Luce, 2019; Hasan et al., 2019; Oasis Intelligence, 2020; Wheeler et al., 2020). Finally, the last sub-category consisted of participants who did not know how the dosing of the *Cannabis* was determined. The majority of participants in this sub-category consisted of experimental *Cannabis* users as well as one previous *Cannabis* user who stopped using *Cannabis* due to unpredictability.

Three sub-categories emerged from the established dosing method category. This was the smallest category with only eight instances where participants mentioned some form of dosing method. The first category consisted only of frequent users and based their *Cannabis* dosing methods on their past experiences. These methods included simply to "*roll the joint as thick as you think*" and then "*you just look with your eyes*" to more calculated methods such as to "*water it down to 10% – 10 ml full THC level and I dilute it with 100 ml olive oil*". Frequent *Cannabis* users, therefore, have positive attitudes toward *Cannabis* with sufficient knowledge (K) regarding *Cannabis* that result in correct *Cannabis* practices (P) (A-K-P). Alternatively, positive attitudes could also have been the result from applying correct knowledge to *Cannabis* practices (K-P-A).

The second category consisted of participants using *Cannabis* until they had gotten the desired effect. Some participants mentioned that they would stop once they had "*gotten the desired effect*" and "*if that wasn't enough, I would take a little bit more*". This dosing method is based on a popular informal guideline, especially for first-time *Cannabis* users to "start slow and go low" (Simon, 2018; Government of Canada, 2019; Brand, 2020; Green Flower, 2020). Finally, the last sub-category consisted of participants seeking other sources of information on which to base their dosing methods. Participants mentioned information sources such as "*Google*" or "*the package instructions*" as their sources of information. As previously discussed, consumers with lower amounts of product experience are more likely to display knowledge-search behaviour (Moore & Lehmann, 1980), a practice which is evident as two of the three instances in this section were experimental *Cannabis* users.

TABLE 5.14: PARTICIPANT DOSING OF *CANNABIS*

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. UNMEASURED	**1.1 Trusted the seller**	"The [CBD infused] drink was a finished product" 15 "It was at a bar in the form of a cupcake" 17 "One of my friends bought it [THC 'joint'] from somebody in a parking lot… I bought it [CBD smoothie] at a bar" 21 "I trusted the stranger behind the bar" 25	15, 17, 21, 25 - experimental (n=4)
	1.2 Trusted friend or relative	"We have used it with friends and they use it on a daily basis, so they knew how to use it [THC]" 1 "We have family friends – she's a herbalist... and she recommended the [CBD] oil" 3 "I got it [*Cannabis* oil] from a friend" 5 "a friend, who had more experience" 6 "always with a friend who had a bit more experience" 11 "close friends that I trust" 18 "In the social scenario, I didn't really have to roll it or anything like that ...it was always provided for me" 22 "asked them [my friends] to explain to me what do I do and they had to explain to me how to take it in and breathe it in" 24	1 - occasional [THC] 3 - experiment [CBD] 5 - experiment 6 - occasional user 11 - occasional user 18 - occasional user 22 - previous user 24 - experiment (n=8)
	1.3 Did not know	"No, I didn't" 1 "No" 4 "No idea" 7 "I didn't really know" 17 "No idea" 1.2 "you got the medicinal dropper, you might get one drop, you might get three, so who knows" 1.1	1 - experiment [CBD] 4,7, 17 - experimental 1.1 - past user 1.2 - occasional user (n=6)
2. MEASURED	**2.1 From experience**	"I water it down to 10%, 10 ml full THC level and I dilute it with 100ml olive oil" 12 "I roll my own joints, I think now that I use more or I use stronger types of weed because I've been smoking for a long time, therefore my tolerance is high compared to a non-user… I would say one medium-sized joint a day" 13 "roll the joint as thick as you think, some people build up a tolerance, so then the joint gets bigger. But for the most part, you just look with your eyes." 1.5	12, 13 - frequent user 1.5 - occasional user (n=3)
	2.3 Until desired effect is reached	"until I'd gotten the desired effect [THC]" 3 "I would take one small pull of a joint and see if that would hit me enough and if that wasn't enough, I would take a little bit more" 8 "I just use it as an ointment as I feel the need" 19	3 - occasional user 8 - past user 19 - use as require (n=3)
	2.4 Other information source	"the [hemp seed] packaging just referred to a tablespoon or a teaspoon... instructions read from Google [THC]" 15 "I followed the package instructions" 18	15 - Frequent Hemp seed 15 - Experimental 18 – experimented with CBD (n=2)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

The last question that was asked to the participants who had consumed *Cannabis*: "***What was your experience after using Cannabis? Why or why not did it meet or not meet your expectations?***". The experienced users (previous user, use as required, occasional user and frequent user) were asked to elaborate on a specific experience as these participants had used *Cannabis* at least four times. This question was asked in both the individual interviews as well as the focus group consisting of participants who had used *Cannabis*. It should also be noted, that, as with the previous question, if a participant was included in the experienced user category of marijuana use but experimented with CBD, the experiences

of both instances were included. This question was responsible for some interesting findings. Participants' experience after consuming *Cannabis* could be grouped into four categories: either consuming *Cannabis* met participant expectations; participants were unsure; consuming *Cannabis* did not meet participant expectations, or participants had a bad experience. These categories can be seen in Figure 5.25 and with their respective quotes in Table 5.15.

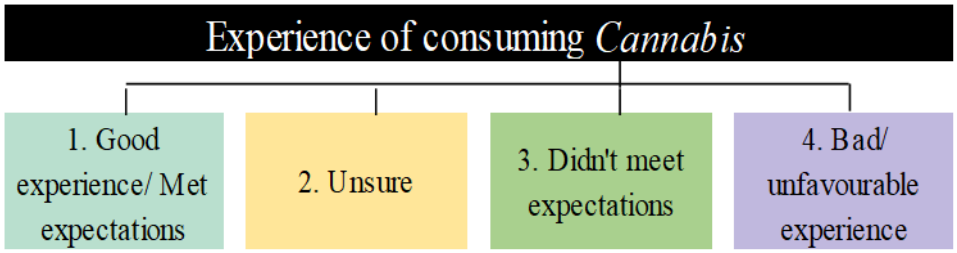

FIGURE 5.25: PARTICIPANT EXPERIENCE AFTER CONSUMING *CANNABIS*.

Figure 5.26 illustrates participants' experience of using *Cannabis* based on their frequency of use. Firstly, experimental users infrequently had favourable experiences after consuming *Cannabis*. The majority of experimental users stated that using *Cannabis* did not meet their expectations and all of the participants who were unsure about their experiences were experimental users. A common phenomenon also described by two participants was that first-time *Cannabis* users (specifically of THC), do not always experience intoxication. One theory mentioned quite frequently on informal *Cannabis* education websites, states that the cannabinoid receptors often need to undergo a sensitisation period (Jacoby, 2017; Elliott, 2019; Barach, 2021). Sensitisation in pharmacology refers to increased sensitivity after continuous exposure to a specific drug (Robinson 2010). The endocannabinoid system of the user should, therefore, be "activated" with a certain amount of *Cannabis* use and even though this theory is yet to be scientifically proven, it might implicate the initial use of *Cannabis*. The theory of a sensitisation period should therefore also be considered in future applications of *Cannabis*-infused edibles.

Another reason that using *Cannabis* did not meet participant expectations could have been due to lack of knowledge. One of the participants mentioned after consuming "*CBD-infused chocolate*" that she did not "*feel a high*", evidence that this participant did not know CBD does not cause intoxication. Furthermore, a lack of knowledge or experience could also result in incorrect consumption. Some participants mentioned that they are "*not a smoker*" with one participant stating that "*after starting to smoke cigarettes, it [smoking Cannabis] was awesome*". In addition, a few participants made reference to getting "*very nauseous*" after "*consuming alcohol before using Cannabis*". Nausea, vomiting and dizziness are common side effects if alcohol use preceding *Cannabis* use (Gunn et al., 2021) which is also known as 'greening out' (Stevens et al., 2021). A lack of knowledge, therefore, led to some participants having an unpleasant experience after consuming *Cannabis*.

The majority of occasional users had good experiences but there were a few occasional users who could recall a bad or unpleasant experience. Two participants stated that using *Cannabis* "*has an effect on your focus and concentration*", commonly associated after using either THC or CBD (Hodgekiss, 2013; Wang et al., 2019; Tarantola, 2020) so they only consume *Cannabis* during their holidays. Similarly, even though consuming alcohol may often have side effects, it is still consumed to escape problems, as a social lubricant and for enjoyment (Abbey et al., 1993).

Finally, all of the frequent users had good experiences when using *Cannabis*. In addition, the participant who used *Cannabis* as required mentioned that using *Cannabis* meets her expectations and that the ointment helps treat her rash. One of the past users also recalled having mostly good experiences from consuming *Cannabis* up until *Cannabis* use resulted in a panic attack.

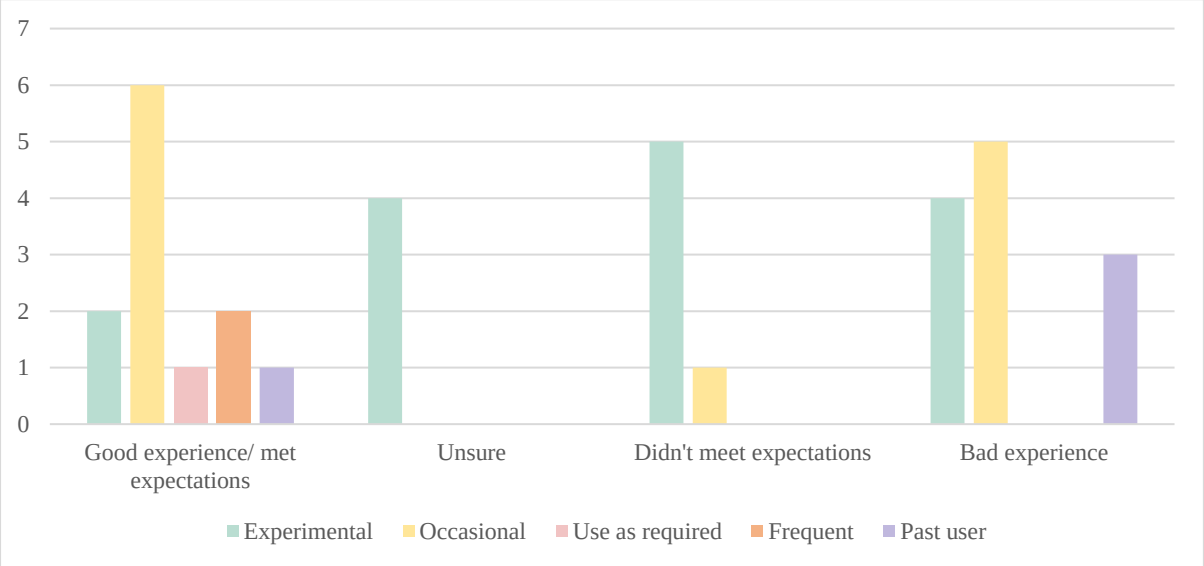

FIGURE 5.26: TYPE OF *CANNABIS* USER AND THEIR RESPECTIVE EXPERIENCES.

Another reason for *Cannabis* use not meeting participant expectations could have been due to participant method of dosing. From the previous section, it was evident that only one experimental user did use a dosing method before using *Cannabis* and all of the frequent *Cannabis* users used some form of dosing method. Figure 5.27 presents participant experiences in relation to having established method of dosing vs. having no dosing method. Almost all participants who had an established method of dosing had good experiences apart from one participant who had a panic attack, however this was after being a chronic *Cannabis* user from a young age.

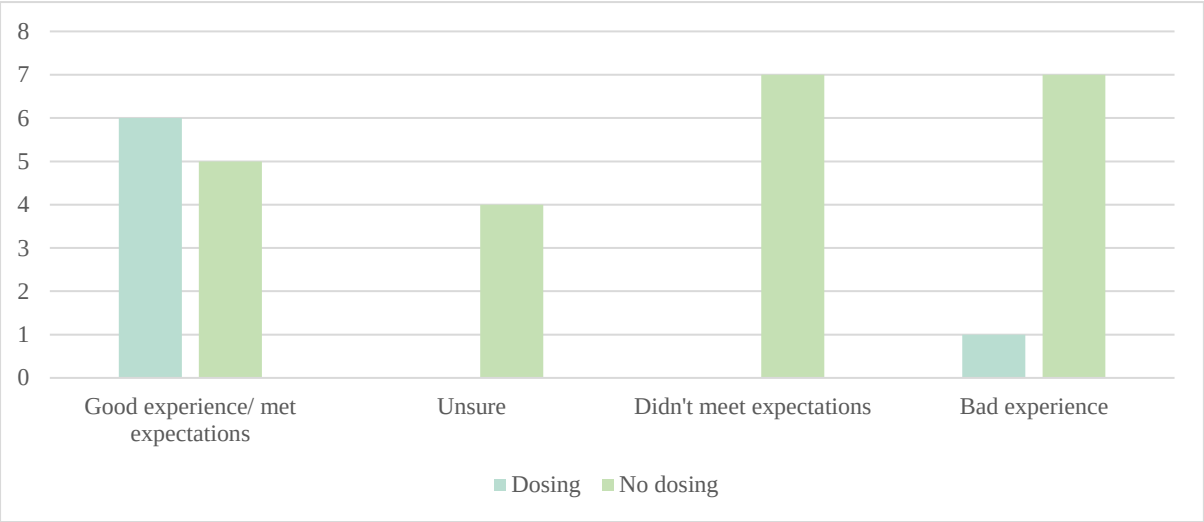

FIGURE 5.27: EXPERIENCES FROM PARTICIPANTS IN RELATION TO HAVING AN ESTABLISHED METHOD OF DOSING VS. NO DOSING METHOD.

TABLE 5.15: PARTICIPANT EXPERIENCES AFTER CONSUMING *CANNABIS*

CATEGORY	QUOTE	REFLECTIVE NOTES
1. GOOD EXPEREINCE/MET EXPECTATIONS	"Yes, I think it [THC] did meet my expectations… it was an enjoyable feeling" 1 "the THC... basically what I thought would happen, it was very relaxed... out of body experience" 3 "I did enjoy the experience, it [THC] definitely relaxed me, definitely helped me with sleep, it helped me enjoy music on another level that I haven't experienced before, I had some deep conversations and I enjoyed that...The CBD also met my expectations, I was actually surprised, you only need a few drops to have an effect... made me relax, helped with sleep" 6 "it was awesome, it was euphoric – it was funny, a good experience, couldn't stop laughing and then I slept like a champion afterwards" 8 "Using THC on its own, I've never had a bad experience, good state of mind, I laugh quite a lot so I get jittery or I just get tired and go sleep and have a deep sleep... CBD oil – calming, pain relief was good, puts you in a mellow state, calm, relaxed" 11 "Yes, I use the CBD daily and the *Cannabis* also, it meets my expectations as and when I require it... [THC] I had no residual effect, I didn't go home feeling now I have to snack, I slept well, I was chilled, I wasn't intoxicated, acting weird or with slurred speech" 12 "Yes – very good [both THC and CBD]" 13 "Good experience [hemp seeds], I don't have to inject as much [insulin], because I ate less carbs, so the hemp seeds helped with the levelling of my sugar... THC had a good experience, a lot of laughing, felt relaxed, I didn't get munchies or anything like that" 15 "I enjoyed the experience... it felt like you are outside of your body but inside and I just laughed at everything... had the typical munchies... I was also extremely paranoid about the weirdest things and then laughed about it" 17 "the bong did meet my expectations... it was just a more natural inhalation – it didn't feel like I was necessarily smoking" 18 "a positive experience it helps with the rash" 19 "I don't have any negative recollection of using it" 1.2	1 – occasional user 3 – occasional user 6 – occasional user 8 – past user 11 – occasional user 12 – frequent user 13 – frequent user 15 – experimental user 17 – experimental user 18 – occasional user 19 – use as required 1.2 – occasional user (n=12)
2. UNSURE	"when you use the CBD, your insomnia goes away, or you don't struggle to sleep, you're more relaxed... I don't know... it could be all in the head" 1 "It was just the one time… I think it might have helped a little bit... I think you should use it more than once" 5 "the CBD had a slight effect on my sugar [increased slightly], but could have been due to caffeine... I didn't have a different experience than if I were to drink a normal energy drink" 15	1 – experimented with CBD [occasional user] 5 – experimental user 15 – experimental user 18 – experimented with CBD [occasional user] (n=4)

CATEGORY	QUOTE	REFLECTIVE NOTES
	"It [CBD] made me feel a little bit relaxed, but not a major feeling like the THC… I was on holiday and not necessarily in a stressful situation" 18	
3. DIDN'T MEET EXPECTATIONS	"I suffer with chronic pain with my knees and I did take it for about a week and then I hadn't felt a difference so then I stopped the usage of that... maybe if I had taken it longer it would have changed and then" 3 "The first time I didn't feel anything, so that did not meet my expectations... no physical effect, didn't relax, and didn't even get red eyes – nothing" 6 "I have tried smoking it, but it didn't have an effect on me" 7 "The first couple of joints I smoked – I didn't feel anything" 8 "I didn't have a bad experience nor did I feel a high.... it didn't really meet my expectations... [CBD] I expected to feel a difference, but I didn't. I also was very jetlagged from travelling through Europe for two weeks, so don't know if that might have had an effect, but I didn't feel an effect at all" 16 "THC did not meet expectations when smoking a joint... I am not a smoker with a cigarette – perhaps that didn't work" 18 "neither the THC nor the CBD met my expectations... [THC] I think I took way too little, probably if I used the whole joint, perhaps I would have felt something – and the joint could have just been a piece of banana skin that's rolled up... [CBD] I think you can't expect miracles after using it once" 21	3 – experimented with CBD [occasional user] 6 – occasional user 7 – experimental user 8 – past user 16 – experimental user 18 – experimental user 21 – experimental user (n=7)
4. BAD/UNFAVOURABLE EXPERIENCE	"sometimes when you use it you get anxiety so that's not the expectations that I was thinking I was going to get" 1 "it was like consuming too much alcohol, I was dizzy and after a while I was nauseas and then the next morning I still felt very bad, still nauseas and only then I heard it was the *Cannabis* that was in the muffins... I think it was an overdose... I also think it wasn't properly prepared... I don't think she even knew what it was or how to use it" 4 "Not great, it raised my heart rate considerably, there was some sensations and stuff but that was about it... It was my first time, I think I know how to use it, except for the dosage, but I think it was my body's response" 7 "Everything changed when I went up to Zimbabwe for my friends 21st birthday... I had a very bad panic attack and it was the first panic attack I've ever had. And from that day on, I suffer with chronic anxiety. So much so where I actually am on anxiety medication for the last six years" 8 "one bad one when I was younger, mixed with alcohol, got very nauseas [greenies], based on consuming alcohol before using *Cannabis*" 11 "It was always a drunken decision… I was really greedy some and it wasn't the best experience at all" 22 "I was drinking, so my inhibition wasn't as strong as it usually is… didn't have a good experience at all. I actually physically went and threw up" 24 "Not at all. I didn't feel anything, just the instant emphysema, it burnt my throat" 25 "I've used the oil [THC] which is very unpredictable… does not always work out in the way you plan it" 1.1 "I used it for around two years and I smoked probably every single day a couple of times, so maybe like 10-12 times… I was feeling anxious and it did help with my anxiety at the beginning, but close to the end, it did start becoming a problem where it would make me more anxious, so eventually I had to stop using" 1.3 "it makes you slow… it really has an effect on your focus and concentration" 1.5 & 1.6	1 – occasional user 4 – experimental user 7 – experimental user 8 – past user 11 – occasional user 22 – occasional user 24 – experimental user 25 – experimental user 1.1 – Past user 1.3 – Past user 1.5 – occasional user 1.6 – occasional user (n=12)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

Finally, the last question asked in the one-on-one interviews as well as both the focus groups was: "***Would you consume a snack infused with Cannabis?***". Figure 5.28 shows participant willingness to

consume a *Cannabis*-infused snack. It should be noted that some participants did often give more than one answer and the researcher asked them for their final answer, which is presented below. Only a small proportion of participants were willing to consume a snack infused with *Cannabis* with half of participants (50%) mentioning that they would consider a *Cannabis*-infused snack under certain conditions. All the quotes from participant conversations were categorised in Table 5.16 even if participants gave more than one answer.

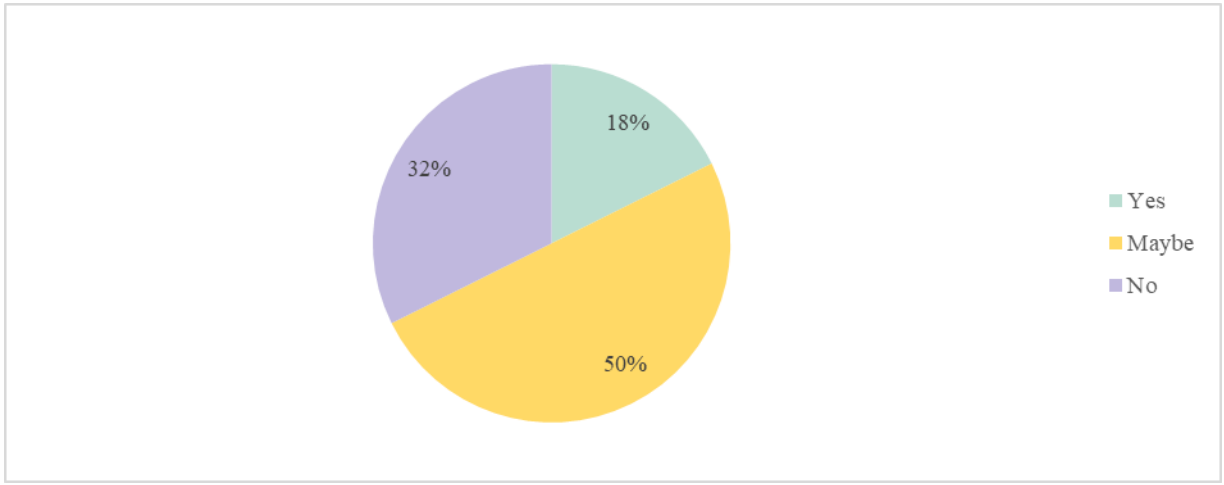

FIGURE 5.28: PARTICIPANT WILLINGNESS TO CONSUME A SNACK INFUSED WITH *CANNABIS*.

Figure 5.29 split participant responses according to their frequency of *Cannabis* use. Only experimental and occasional users answered "Yes" as they were willing to try a *Cannabis*-infused snack without any conditions. The majority of user types answered "Maybe" as they had certain conditions under which they were willing to eat a *Cannabis*-infused snack. This excluded the participant using *Cannabis* as required and the past *Cannabis* users. Furthermore, the majority of non-users followed by past *Cannabis* users answered "No" as they were not willing to consume a snack infused with *Cannabis*.

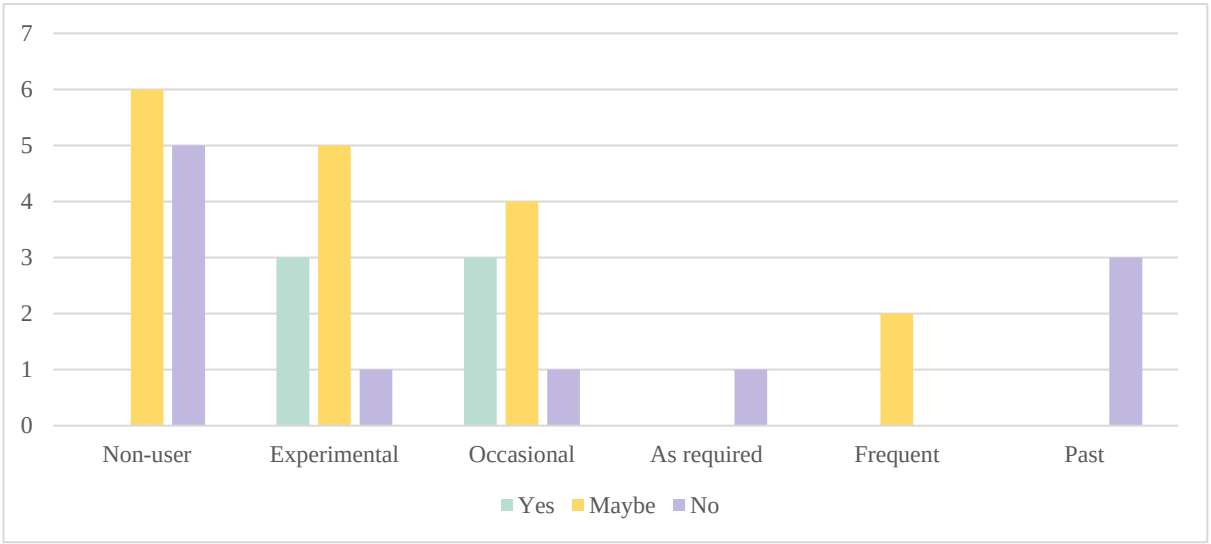

FIGURE 5.29: PARTICIPANT WILLINGNESS TO CONSUME A *CANNABIS*-INFUSED SNACK CATEGORISED BY TYPE OF *CANNABIS* USER.

The categories that surfaced during this question are illustrated in Figure 5.30. While the majority of participants said that they would consume a *Cannabis*-infused snack under certain conditions, the unwilling category generated the most sub-categories.

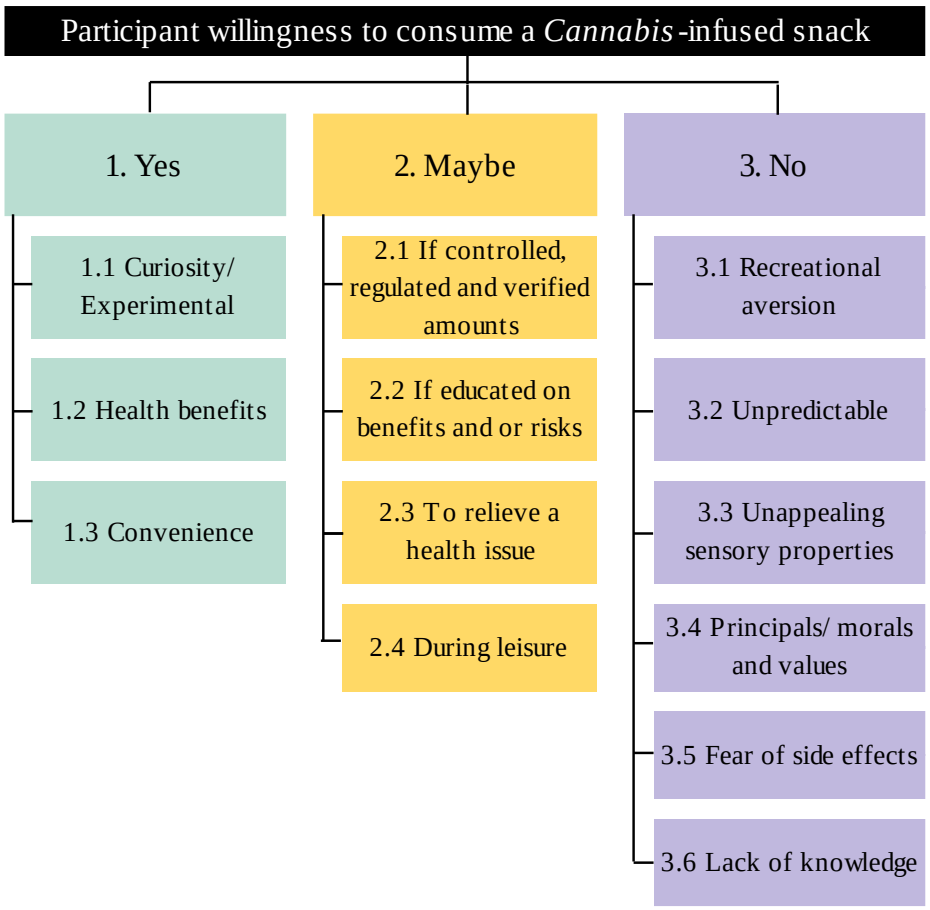

FIGURE 5.30: PARTICIPANT WILLINGNESS TO CONSUME A *CANNABIS*-INFUSED SNACK.

A minority (18%) of participants in the current study were willing to consume a snack infused with *Cannabis*. In contrast, a recent study conducted amongst Canadians found that almost half (46%) of participants were willing to consume *Cannabis* edibles (Charlebois et al., 2018). It should be noted that *Cannabis* is legal for both recreational and medicinal use in Canada and Borodovsky et al. (2016) found a correlation between legalisation of recreational *Cannabis* and an increase in the consumption of different edibles. Participants provided three reasons why they would be willing to consume a snack infused with *Cannabis*.

Motives for being willing to consume *Cannabis* included curiosity, for health applications and for convenience. Two of the participants willing to consume a *Cannabis* snack out of curiosity were experimental *Cannabis* users with the remaining participant an occasional marijuana user (but experimented with CBD). A possible health benefit was another reason that participants were prepared to consume a *Cannabis*-infused snack. The last reason for being willing to consume a *Cannabis* snack was out of convenience. One participant was "*a lot more open to ingesting something that is sort of store bought rather than to go through the whole rolling your own joint*".

The next category consisted of participants who were conditionally open to consuming a *Cannabis*-infused snack. These categories had four sub-categories with the majority of participants being conditionally open to consuming a *Cannabis*-infused snack. Firstly, participants mentioned that if the snack is "*tested and trialled and it is organic and verified*" with "*the right authorities and governing bodies on it*", they would be more inclined to consume a *Cannabis*-infused snack. This category relates to both the previous knowledge and attitude sections where participants raised concern over the lack of verification on current *Cannabis* products.

The next category consisted of mostly non-user participants who wanted "*more information before I consume anything*" in addition to "*why they are putting it in the snack or food*". It is evident that consumers are still uninformed regarding the nutritional benefits associated with hemp (Crescente et al., 2018; Leonard et al., 2020; Cerino et al., 2021) and marketers should consider effectively communicating the nutritional benefits and the health-promoting compounds present. Furthermore, effective marketing would also encourage the purchase of a *Cannabis*-infused snack as the third category consisted of participants who would consider a *Cannabis*-infused snack if the snack was able to relieve a certain health issue. Participants' willingness ranged from highly unlikely ("*[if] there was no other way out*") to more likely ("*maybe if I had a bit of a rough day*").

The last sub-category consisted of participants who were open to consuming a *Cannabis*-infused snack if it was during leisure time. Some participants "*are subject to drug testing at wor*k" and "*any Cannabis in my system would be an immediate dismissal*". A drug test is aimed at detecting THC or THC metabolites (Caporuscio, 2020) and full-spectrum CBD contains the highest amounts of THC, which is less than 0.3% (Royal CBD, 2021). However, there have been cases where a CBD product was verified by both the U.S. Food and Drug administration and the manufacturer to contain only trace amounts of THC which later turned out not to be the case (Herbst & Musgrave, 2020). Again, this stresses the need to verify *Cannabis* products using a strict quality assurance protocol not only to ensure user safety but also to ensure that the user would feel comfortable to consume the edible.

The next category consisted of the nearly one third (32%) of the participants who were not willing to consume a snack infused with *Cannabis*. While this category was not the largest category, it had the most sub-categories and consisted of mostly non-*Cannabis* users. The first category consisted of participants who had an aversion to "*get mellow or high*".

Next, there were participants who stated that eating a snack infused with *Cannabis* "*is too unpredictable*" with the effects "*more intense and only kicks in at different times*". Consequently "*it can get you too high and it could be a bad experience*". Participants who contributed to this category were also experienced *Cannabis* users. Indeed, various factors such as previous meals (Ogletree, 2020), metabolism (Borodovsky et al., 2016), body weight, in addition to the amount and type of *Cannabis* product (Ferguson, 2019; Weil, 2021) would influence the absorption of the active phytocannabinoid.

However, the participants referred to THC rather than CBD. High dosages of THC can be as little as 50 mg which can result in an unpleasant experience even for experienced *Cannabis* users (Sulak, 2020) whereas CBD can be safely consumed in a dosage up to 1,500 mg (Iffand & Grotenhermen, 2017). Furthermore, even though hemp seeds are considered safe and a good source of fibre (U.S. Department of Agriculture, 2015) excessive amounts of fibre (70 g, which corresponds to around 110 g hemp seeds) may lead to some abdominal discomfort (Dresden, 2018).

Two participants also stated that *Cannabis* had unappealing sensory properties, another reason why participants would not consume a *Cannabis*-infused snack. One participant mentioned that "*I don't like the taste and smell of Cannabis*". Both participants in this category had used *Cannabis* prior. This can be attributed to the volatile terpenes present in *Cannabis* which are responsible for its aromatic properties (Hazekamp et al., 2016). While these flavours can be masked with additives, some researchers are also looking at complimentary flavours such as citrus blends, hops and fruit notes to improve the flavour (Peckenpaugh, 2020).

The next sub-category consisted of one participant who would not consume a *Cannabis*-infused snack as consuming *Cannabis* was against her values and morals, similar to her reasons for abstaining from *Cannabis*. This participant was a non-user with a negative attitude towards *Cannabis*.

The next category consisted of participants who were not willing to consume a *Cannabis*-infused snack out of fear for possible side effects such as getting "*hooked on it*", "*high*" or to "*get schizophrenia from it*". As previously mentioned, the abovementioned side effects are associated with THC (Khan & Akella, 2009; Crippa et al., 2009; Rubino et al., 2012; Holland, 2019; Krebs et al., 2019; Urits et al., 2020; Crane, 2021). It should be noted that five out of the six participants in this category were not aware of the difference between THC and CBD. In addition, this category included non-users and older age (35+ years) participants. A lack of knowledge (K) therefore led to negative attitudes (A) toward *Cannabis* overall that resulted in participants avoiding the consumption of *Cannabis* or *Cannabis*-infused products (P).

Similarly, the last category consisted of one participant who would avoid a snack infused with *Cannabis* due to a lack of knowledge. The participant stated that *Cannabis* is "*very much foreign territory*" and would "*steer clear*". In addition, this participant was also a non-user and the eldest participant in the 1950-1959 age range.

TABLE 5.16: PARTICIPANT WILLINGNESS TO CONSUME A *CANNABIS*-INFUSED SNACK

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
1. YES	**1.1 Curiosity/Experimental**	"I would try it just to see what happens" 3 "it will definitely be for curiosity" 7 "it would definitely be an experimental thing to see what it would do to me personally" 24	(n=3)
	1.2 Health benefits	"Yes... as I get older, I think I would have more of a use for CBD type of products. 6 "especially the health and benefits part" 15 "Yes – the CBD I would consider… I've heard of a lot of good stories" 21	(n=3)
	1.3 Convenience	"Yes, I would be a lot more open to ingesting something that is sort of store bought rather than to go through the whole rolling your own joint and smoking it" 22	(n=1)
2. MAYBE	**2.1 If controlled, regulated and verified amounts**	"if it was induced properly and if there was research on it, the answer will be maybe" 4 "it depends on how much is in there" 5 "If I know that it is medically placed there, it is a *Cannabis* sweet – it is induced, it is proven with the right authorities and governing bodies on it." 12 "As long as it has been tested and trialled and it is organic and verified." 18 "maybe if it is in a snack – measured in a certain, consistent amount" 1.1 "if it is a nice snack and there is a well-measured amount of CBD in it I would probably buy it" 1.5	(n=6)
	2.2 Require education	"Probably yes, if I know the benefits of it" 17 "[if] there is a lot of research done on it of the benefits, I wouldn't have a problem with using it" 2.1 "I would like to know why they are putting it in the snack or food... would be part of the healthy snack food trend that is going on currently, like for instance moringa powder" 2.3 "I would like to have more information before I consume anything" 2.2	(n=4)
	2.3 To relieve a health issue	"If the snack has medicinal properties and I am ailing and that is the cure for my ailment, maybe." 2 "If I had an illness and it was prescribed by a doctor and there was no other way out" 10 "maybe if I had a bit of a rough day or a tough time" 11 "if there's a massive benefit... that *Cannabis* can extend your life by 10 years, then you never know" 14 "if I have something like a pain issue or struggling with sleep" 20 "maybe if I would find a need for it or develop some chronic condition" 21 "if it is one that can take away hunger and I could lose weight, then I would definitely buy it" 1.1 "because CBD has stress-relieving properties, I would consider buying it if it is a snack that I can take before my exam to calm me down" 1.5	(n=8)
	2.4 During leisure	"maybe when I am not doing anything... on a day where I have to go to work, no" 1 "as long as I'm not working" 13 "we are subject to drug testing at work, so I would obviously need to be cautious of that" 16 "any *Cannabis* in my system would be an immediate dismissal" 1.1	(n=4)
3. NO	**3.1 Recreational aversion**	"not the recreational part" 15 "the association of dagga is bad" 19 "I won't ever use it [THC] for pleasure purposes." 21 "if there's not THC in and I won't get high, then I would use it, but not just for fun" 2.5 "THC, if it is to get mellow or high or sleep better, definitely not" 1.1	(n=5)

CATEGORY OR SUB-CATEGORY		QUOTE	REFLECTIVE NOTES
	3.2 Unpredictable	"the problem is that you cannot determine the dosage and it can get you too high and it could be a bad experience" 8 "when you eat it, I feel like the results on what actually takes place in your body, is a lot more intense and only kicks in at different times" 1.3 & 1.4 "Also, with my experience, it is too unpredictable... it also depends on your body, what you've done and what you've eaten in between" 1.1	(n=4)
	3.3 Unappealing sensory properties	"Personally, no, I don't like the taste and smell of *Cannabis*" 11 "I don't think it can taste good. The smell and taste after I've used it was not nice" 25	(n=2)
	3.4 Principles/morals and values	"Never… It is just not part of my religion" 9	(n=1)
	3.5 Fear of side effects	"Not knowingly, no. I would be too afraid of getting hooked on it." 2 "I don't want to be high" 5 "the side effects and the risks involved" 9 "I would fear to become addicted to it" 19 "No, I won't… I'm scared I could get schizophrenia from it" 23 "I think I am adverse to any addictive things in food – the same with sugar… I firmly believe you can get addicted to sugar as well" 2.2	2, 9, 23, 2.2 non-user 5, 19 – 35+ years (n=6)
	3.6 Lack of knowledge	"If I know *Cannabis* is in there, I would steer clear… for me it is very much foreign territory " 2.4	(n=1)

Footnote: Numbers at the end of each quote indicates participant code for individual interviews and focus group discussions.
1.x – participants who have used *Cannabis*.
2.x – participants who have not used *Cannabis.*

5.6 CONCLUSION

This chapter revealed the findings obtained from the data collection instruments according to the study objectives. The next chapter presents the conclusions and interpretation of the most significant findings from the study. Furthermore, the contribution, recommendations and current limitations of the current study are also discussed together with possible future research on fibre-type *Cannabis*.

CHAPTER 6 – STUDY CONCLUSIONS

This chapter discusses and draws conclusions from the main findings of the study and these are directed towards showing that the study objectives were addressed. Furthermore, the contribution of the study is discussed, recommendations are made and, finally, the limitations of the study are provided.

6.1 INTRODUCTION

The previous chapter discussed the findings of the study in accordance with the research objectives that were set out in the study. Furthermore, Chapter 5 provided some insights into consumer knowledge, attitudes and perception/practice of *Cannabis* and *Cannabis*-infused snack foods. This chapter presents conclusions with interpretations obtained from the main findings according to the research objectives. Thus, an overview of the research aim and objectives is presented to provide context:

This study aimed to explore the ***South African consumer knowledge, attitude and perception/practice (KAP) of Cannabis and Cannabis-infused snack foods*** and consequently, the following objectives were formulated:

Objective 1: To explore South African consumer knowledge regarding fibre-type *Cannabis*.

1.1 In terms of their subjective knowledge

1.2 In terms of their objective knowledge

Objective 2: To explore South African consumer attitude towards fibre-type *Cannabis*.

Objective 3: To explore South African consumer perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods.

6.2 DEMOGRAPHIC PROFILE OF PARTICIPANTS

In this study, twenty-five (25) individual interviews were conducted and two focus groups. One focus group consisted of five (5) participants while the second focus group comprised six (6) participants. Therefore, a total of thirty-six (36) participants contributed to the findings of this study. The majority of participants were aged between twenty-two (22) and thirty-one (31) years and there was an almost even gender split between the participants. The geographic locations varied, however, with the majority of participants being from Mpumalanga and Gauteng, South Africa. Most participants had tertiary education. Furthermore, the occupation of the study participants varied and included participants who worked in information technology, marketing and communication, the food industry, engineering, medicine (doctors) with the majority of participants in the educational sector. The demographic profile of participants influenced their individual knowledge, attitudes and perception/practice of *Cannabis*, particularly when looking at participant age.

6.3 RESEARCH PROBLEM IN BRIEF

Cannabis was prohibited for most of the last century and this restricted research so that existing literature rather focused on the prevention of psycho-active *Cannabis* use. As more and more countries have relaxed their stringent *Cannabis* laws, the global consumption of *Cannabis* has increased, with South Africa being no different. In 2018, South Africa legalised *Cannabis* for private use and removed some forms of CBD as a scheduled drug. Consequently, extensive market opportunities regarding *Cannabis* have opened up in the agricultural, pharmaceutical and the food industry, to name but a few. Food manufacturers have addressed the need by supplying convenience foods such as snacks that do not require preparation and which are nutritious as they include food ingredients high in nutrients such as phytochemicals - both factors contributing to an increase in the popularity of snacks amongst consumers.

Fibre-type *Cannabis* contains an abundance of phytochemicals in its seeds, the flowers and leaves, the latter being particularly high in cannabidiol (CBD), a phytocannabinoid of particular interest to consumers. Limited research, however, exists as to consumer knowledge, attitude and perception/practice of *Cannabis* and *Cannabis*-infused snacks, indicating a considerable knowledge gap amongst producers and consumers alike. Thus, a similar knowledge gap was to be expected in South Africans but this is of concern as insufficient knowledge on this subject may not only prejudice potential consumers against such snacks but also place consumers at risk regarding side effects from ingesting fibre-type *Cannabis*, specifically CBD. This knowledge gap merits research as to consumer knowledge of, their attitudes toward and their perception/practice of *Cannabis* and *Cannabis*-infused snacks.

6.4 STUDY CONCLUSIONS

Conclusion 1 relates to the first study objective which was to explore South African consumer knowledge regarding fibre-type *Cannabis*. As consumer knowledge includes both subjective knowledge as well as objective knowledge, these will be discussed separately as Conclusion 1a and conclusion 1b, respectively.

6.4.1 Conclusion 1

As study objective 1 was split into two with one focussing on subjective knowledge and the other on objective knowledge, so Conclusion 1 will be split into Conclusion 1a and Conclusion 1b, likewise concentrating on subjective knowledge and objective knowledge, respectively.

6.4.1.1 Conclusion 1a

The following comments relate to the exploration of South African consumer's subjective knowledge regarding fibre-type *Cannabis*.

It was apparent that all participants in the current study possessed subjective, or self-assessed, knowledge on *Cannabis*. This emerged from the first question asked in both the individual interviews and the focus groups. It should be noted that *Cannabis* was referred to generically as not all participants were aware of the differences between drug-type and fibre-type *Cannabis*. From the word "*Cannabis*", participants referred to either a medicinal or recreational drug with some participants further referring to the stigma surrounding the recreational use of *Cannabis*. Older age was strongly associated with this category and all participants who mentioned the stigma surrounding *Cannabis* use were older than 35 years. This attitude could be attributed to the experience during most of the lives of these older participants when *Cannabis* and its use was illegal and related to criminal activities. It should be noted that the recreational use, and consequently the stigma surrounding *Cannabis* use, is related to tetrahydrocannabinol (THC) from marijuana rather than fibre-type *Cannabis* that has a relatively low THC content compared to marijuana. Furthermore, participants made a botanical reference to *Cannabis* with most participants concluding that *Cannabis* either was a plant or "comes from" a plant. Interestingly, some participants, especially the more frequent *Cannabis* users, referred to the different "strains" such as *C. indica* and *C. sativa* that cause different effects. However, *C. indica* and *C. sativa* rather refer to the botanical classification of the plant rather than their effects on users.

Furthermore, some participants referred to the methods of consuming *Cannabis*, it's origins in terms of geography and history as well as the legislative aspects surrounding *Cannabis*. Some participants, especially the participants in the educational sector, recalled from past experience that *Cannabis* was negatively associated with underage usage and exposure. Finally, there were a few participants who were older age and non-users who stated that they had limited knowledge as to *Cannabis*.

While exploring the benefits of *Cannabis*, participants largely associated these benefits with remedial benefits including the use of *Cannabis* to treat chronic conditions, aches and skin rashes. Participants also referred to the calming effects that *Cannabis* elicits in addition to *Cannabis* being superior to conventional medicine. With the exception of three participants, each participant could mention at least one remedial benefit associated with *Cannabis*. Again, these three participants were older than 35 years and had noticeable negative associations with *Cannabis*. A participant also referred to the benefits of using *Cannabis* for pets and three participants concluded that the *Cannabis* industry would be able to create jobs and subsequently improve the economy. Furthermore, some participants mentioned benefits that were applicable to the intoxicating effects of THC rather than CBD. These included marijuana being safer and less addictive than other intoxicating substances and marijuana being useful as a social lubricant.

Amongst the risks involved with intake/use of *Cannabis*, only a few could be related to fibre-type *Cannabis* and risks were mostly associated with the use of marijuana. These risks included the psychological conditions that could be triggered following marijuana use while other risks that were

mentioned included physiological effects such as intoxication, effect on brain activity and dependency. There were participants who concluded that using *Cannabis* would lead to the user desiring "harder" drugs, which is also commonly referred to as a "gateway drug". Finally, participants mentioned the risks of adolescent and children's usage/exposure to marijuana.

Participants also referred to risks that were applicable to both marijuana and hemp. Firstly, participants concluded that using *Cannabis* may lead to a disinclination to activity, common effects of both THC and CBD. Furthermore, since there are still relatively strict laws surrounding the selling and distribution of *Cannabis* (apart from some forms of CBD), these activities are still considered a criminal offense. Therefore, using and/or distributing *Cannabis* could be risky. Other risks associated with both THC and CBD were the lack of validation or verification as well as inexperienced or incorrect usage of *Cannabis*. When combining ignorance with an unregulated product, this could not only put the user and manufacturer at risk but could also have a detrimental effect on consumer acceptance of *Cannabis*. Thus, there is an urgent and essential need for consumer awareness through effective marketing communications and regulation of *Cannabis* products.

For the purpose of this study, "addictive" referred to someone being physiologically dependent on a specific substance sufficient that may inhibit their normal function. Alternatively, "habit-forming" referred to an established act that is done routinely or regularly, and even though difficult to stop, it is not a physiological dependency. When exploring *Cannabis* as habit-forming or addictive, the majority of study participants concluded that *Cannabis* was addictive but there were some participants who argued that *Cannabis* was habit-forming. Again, it should be noted that some participants were not aware of the differences between fibre-type and drug-type *Cannabis*. However, in the case where participants were aware of the difference between THC and CBD, THC was mostly associated with being addictive. Some participants were, however, of the opinion that forming a habit or addiction would depend on the user's personality. Finally, only a small proportion of participants stated that *Cannabis* was neither habit-forming nor addictive.

All of the participants therefore, possessed a degree of subjective knowledge regarding *Cannabis*, however their subjective knowledge was mostly related to marijuana rather than hemp. The fact that consumers were mostly unaware of CBD or hemp may be attributed to mass-media such as news, magazines and the entertainment industry associating *Cannabis* and *Cannabis*-infused snacks with the effects of THC or marijuana. Consequently, consumers would associate *Cannabis* as a whole with negative side effects such as intoxication, dependency and a trigger for psychological conditions whilst CBD and CBD-infused snacks could in fact, assist in reducing or treating these side effects.

Alternatively, consumers are becoming aware of the benefits, especially in health and therapeutic applications, concerning *Cannabis* and *Cannabis*-infused snacks and knowledge of these benefits have been spreading especially through word of mouth amongst consumers. The benefits and risks

concerning *Cannabis* were mostly associated with *Cannabis* consumption and it was evident that other facts surrounding *Cannabis*, such as environmental benefits and economic potential of *Cannabis* may often be overlooked. Therefore, whilst marketing *Cannabis* and *Cannabis*-infused snacks for its potential health benefits may fit into existing market trends, its potential benefits to the environment should also be considered. Finally, non-*Cannabis* users mostly have negative associations with *Cannabis* and do not necessarily know the difference between hemp and marijuana.

This concluding discussion supports the assertion that this study suitably addressed the first study objective that was to explore South African consumer's subjective knowledge regarding fibre-type *Cannabis*.

6.4.1.2 Conclusion 1b

The following discussion relates to objective knowledge possessed by study participants regarding fibre-type *Cannabis*. In particular, this will focus on the different pharmacodynamic-qualities as well as South African legislation regarding marijuana and hemp.

The objective knowledge of study participants, which is their factual knowledge, was explored relating to the phytochemicals present in *Cannabis*. There were a few informed participants who were aware of tetrahydrocannabinol (THC) and cannabidiol (CBD). Few participants, however, made reference to THC and CBD belonging to a larger group of phytocannabinoids. Alternatively, there were some participants who were unaware that THC and CBD were referred to as "chemicals" (or specifically phytochemicals) but could later differentiate between THC and CBD. Furthermore, some participants either only knew of THC or only knew of CBD. More participants were, however, aware of THC rather than CBD. This reinforces statements issued by mass-media that relate *Cannabis* mainly to the intoxicating effects of THC. However, the majority of participants, especially non-users, did possess limited objective knowledge regarding the phytochemicals present in *Cannabis*.

More in-depth probing into the main difference between THC and CBD showed that three out of five participants from the individual interviews did not know the difference between THC and CBD. The majority of participants who could not differentiate between CBD and THC were either non-users or experimental *Cannabis* users who only used *Cannabis* three times or less. Alternatively, the majority of participants who had used *Cannabis* four times or more could distinguish between THC and CBD. However, there were experienced users who were unable to differentiate between the two compounds. This does raise some concern as consuming the incorrect phytocannabinoid can ultimately affect the user's experience resulting in unfavourable attitudes towards these compounds in general.

The vast majority of participants, however, possessed objective knowledge regarding the recent changes in *Cannabis* legislation in South Africa. Almost all of the participants could recall that there was a recent change in the law and only a few participants were either unsure or did not know of a recent

change in the *Cannabis* law. Three out of four participants were, furthermore, specifically aware of *Cannabis* being decriminalised, perhaps due to *Cannabis* recently appearing in the media regarding legalisation for private use. Furthermore, some participants also elaborated on the legislation. Participants added that the selling and distribution of *Cannabis* remains prohibited with some participants making reference to features of *Cannabis* in South Africa such as the "dagga couple", specific dates relevant to the legislative aspects as well as the grey areas in the current law. The *Cannabis* for Private Purposes Bill was passed a year prior to when the interviews were conducted which clarified some of the grey areas referred to by participants. However, the release of the Bill did not receive as much media attention as the ruling to decriminalise *Cannabis* and consequently some participants were unaware that some of the ambiguous points from the first ruling had been clarified. Alternatively, several participants did refer to specific aspects of *Cannabis* including quantities permissible for possession, transporting and amounts of plants permissible to be grown in a private dwelling, all information highlighted in the recent Bill.

After exploring participant objective knowledge regarding *Cannabis* and its constituents, it was apparent that *Cannabis* users possessed better objective knowledge than non-users, experimental users or older generations. This was especially prevalent while exploring participant objective knowledge of the phytochemicals present in *Cannabis*. Therefore, consumers, especially older generations and non-users, may refrain from consuming a CBD-infused snack for fear of becoming intoxicated due to lack of objective knowledge. Alternatively, frequency of use did not necessarily determine participant objective knowledge regarding *Cannabis* legislation in South Africa. Perhaps this suggests that media communications on current events are still one of the most effective tools for creating consumer awareness of *Cannabis* that will ultimately influence consumer attitudes towards *Cannabis* and *Cannabis*-infused snacks, which is discussed in the next section.

This concluding discussion supports the assertion that this study suitably addressed part 2 of the first study objective that was to explore South African consumer's objective knowledge regarding fibre-type *Cannabis*.

Combining **Conclusions 1a** (that addressed subjective knowledge of *Cannabis* within the KAP model) and **Conclusion 1b** (that addressed objective knowledge of *Cannabis* within the KAP model) supports the assertion that this study suitable addressed study objective 1 that was **to explore South African consumer knowledge regarding fibre-type *Cannabis***.

6.4.2 Conclusion 2

The following discussion explores South African consumer's attitude toward fibre-type *Cannabis*.

While a few participants were optimistic as to the economic potential and the environmental benefits concerning *Cannabis*, participant attitudes were strongly associated with its intended use. The majority

of participants had positive attitudes toward the remedial benefits associated with *Cannabis*. The three most common remedial benefits were in treating cancer, for pain relief and the calming effects that *Cannabis* elicit. Alternatively, only a small proportion of participants had a positive attitude toward the recreational use of *Cannabis* or marijuana. This was due to recreational *Cannabis* (marijuana) being perceived as safer with fewer side effects compared to other stimulants and intoxicating substances, such as alcohol and other illicit drugs. The majority of participants, however, had a negative attitude toward recreational use of *Cannabis* as well as the impact of underage usage and/or exposure relating to marijuana specifically. Furthermore, some participants concluded that their negative attitudes were due to social psychological factors such as the stigma surrounding the use of marijuana. Again, these factors were associated with increased age of participants and their non-use of *Cannabis*.

Negative attitudes toward *Cannabis* that were applicable to both hemp and marijuana involved the irresponsible use of *Cannabis*. As mentioned in the previous section, there is an urgent need to standardise and verify *Cannabis* products. In addition, participants also use *Cannabis* based on limited knowledge which can have negative consequences and side effects which feeds back into negative attitudes toward *Cannabis* on the part of the study participants. The common side effects mentioned amongst study participants were that *Cannabis* use triggered anxiety and led to addiction, effects which are rather associated with marijuana use. However, another side effect responsible for participant negative attitudes was associated with the use of either THC or CBD, which is lethargy. Consequently, several participants had conditionally positive attitudes toward *Cannabis* with a considerable number of the participants supporting the responsible use of *Cannabis*. Interestingly, this category consisted of both users and non-users who required that *Cannabis* be regulated both medically and recreationally. However, the majority of participants who were *Cannabis* users did not obtain their *Cannabis* from a regulated source but rather a friend or a relative. Finally, a few participants were undecided about their attitudes toward *Cannabis* due to their having limited knowledge, feeling ambivalent toward *Cannabis* or that they would only consider *Cannabis* as a last resort.

Whereas the general attitudes toward *Cannabis* varied, almost half of participants supported the decriminalisation of *Cannabis* with some participants deeming further improvement on regulations necessary. It was evident that attitudes toward *Cannabis* legislation were more positive than *Cannabis* overall. It should be noted that participants had better knowledge regarding the *Cannabis* legislation as opposed to *Cannabis* itself. This suggests that having better knowledge on a topic, may result in better attitudes. Alternatively, almost a third of participants were opposed to the ruling, a minority of participants neither supported nor opposed the legislation and a few participants could not comment as they had a lack of knowledge regarding the South African *Cannabis* legislation. Once more, a lack of knowledge was associated with participants who were aged older than 35 years or who were non-*Cannabis* users.

A common view amongst study participants was that there was improvement required regarding regulations and control as this would make the use of *Cannabis* safer. There were also study participants who were of the opinion that legislation should ensure accessibility to everyone, especially the elderly, for medicinal purposes. Alternatively, participants against the ruling were concerned for the same reason and that the legislation would improve accessibility to individuals such as adolescents who were too young and so unfit to consume *Cannabis*. In addition, there was an apparent lack of trust in the South African government not only as to enforcing the laws but also as to the reasoning behind why the ruling was passed in the first place. There were several participants who referred to the high rate of substance abuse that is already a problem as well as the lack of education amongst South Africans. Participants were concerned of the common side effects such as unproductivity and hindrance of brain activity relating to marijuana use that would have detrimental effects on the average level of education amongst South Africans.

Considering consumer attitudes were more in favour of the therapeutic and health benefits associated with *Cannabis*, positioning *Cannabis* or a *Cannabis*-infused snack as such would improve consumer reception towards edibles. In additional, given consumer focus shifting towards the preservation of the environment, communicating environmental benefits of *Cannabis* to consumers may increase consumer acceptance of *Cannabis* and *Cannabis*-infused snacks even further. Finally, considering consumers' evident lack of confidence in the government, the private sector may be more effective in communicating benefits and dosing of CBD and CBD-infused snacks to the public. Overall, research from the current study suggested that South Africans showed a generally negative attitude towards *Cannabis*, particularly due to risks associated with its use and *Cannabis* legislation that appeared mirky and may promote crime and adolescent *Cannabis* use. Thus, the general attitude of study participants toward *Cannabis*-infused snacks was negative.

These concluding comments support the assertion that this research study suitably addressed study objective 2 that was **to explore South African consumer attitude towards fibre-type *Cannabis***.

6.4.3 Conclusion 3

The following discussion explores South African consumer perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods.

In addressing study objective three, participants were divided into *Cannabis* non-users (never used) and *Cannabis* users (used at least once). The majority of study participants used *Cannabis* at least once with almost a third of participants never previously using *Cannabis*. More in-depth probing of the motives for not consuming *Cannabis* produced individual-specific motives. These included the use of *Cannabis* being contra to participant principles, morals and values; a lack of interest; participants recalling previous experiences of substance abuse with relatives or friends; caution on the part of participants as

to possible side effects, while some participants suggested lack of accessibility as a motive for not consuming *Cannabis*.

Alternatively, while exploring reasons for consuming *Cannabis*, the majority of participants consumed *Cannabis* out of curiosity, due to its therapeutic properties or as a recreational substance. There were some participants who consumed *Cannabis* after it was offered by a trusted source and one participant mentioned the accidental consumption of *Cannabis*.

Two methods of consumption surfaced in the current study. Either *Cannabis* was consumed orally or it was applied externally (transdermal application). Oral methods of consumption could further be divided into ingestion via eating, drinking or sublingual applications or by inhalation through vaporisation, cigarettes or other smoking paraphernalia. The method of consumption was linked to participant reasons for consumption so that participants who used sublingual and transdermal methods consumed *Cannabis* for medicinal purposes. Alternatively, eating, drinking and inhalation of *Cannabis* was mostly associated with recreational use. Regarding CBD edibles that are currently on the market, these are, however, consumed for health benefits and food product developers could, therefore, consider the methods of consumption and the intended use of *Cannabis* edibles and develop market startegies accordingly.

Participants were then divided based on their frequency of *Cannabis* use. Participants who consumed *Cannabis* three times or less were classified as experimental *Cannabis* users and these users made up almost a third of participants who have used *Cannabis*. Alternatively, participants who have used *Cannabis* four or more times were classified as experienced *Cannabis* users and these users were further split into past users, use as required, occasional users and frequent users. Comparing frequency of use to participant responses also yielded additional findings so that, for instance, dosing methods used when consuming *Cannabis* and frequency of use of *Cannabis* appear to be related.

No method of dosing was especially prevalent amongst experimental and occasional users, emphasizing the frequency and consequent risk of uninformed *Cannabis* usage. Here, most participants either obtained their dosing instructions from a trusted source such as a friend or relative, from the *Cannabis* seller or those participants simply had no knowledge as to measuring the dosage. On the other hand, frequent users and the particular study participant who used *Cannabis* as required always used some sort of dosing method. Thus, the dosing methods and experience with *Cannabis* use appeared related. Note that some variables influence the absorption time of *Cannabis*-infused snacks and these include the amount of active ingredients in the *Cannabis* together with features of the user such as time of previous meals and user weight and metabolism. Product developers could, therefore, formulate the serving size(s) of *Cannabis*-infused snacks in accordance with user weight and communicate additional information regarding absorption-time to the consumer on the packaging.

Cannabis user experiences were categorised by study participants as good (met expectations), unsure, didn't meet expectations and bad/unfavourable. Several motives for participant experiences were also explored. The theory of a sensitisation period was considered as a possibility for not experiencing any effects, especially amongst experimental/first time users. Lack of knowledge was another motive for having unfavourable experiences, especially when consuming alcohol beforehand. In addition, consuming *Cannabis* did not meet the expectations of some study participants possibly due to a lack of knowledge regarding methods of consumption as well as an inability to differentiate between THC and CBD. This further reinforces the need to create awareness and educate consumers on the effects and use of THC and CBD.

Participant frequency of *Cannabis* use was also compared as to study participant experiences. Past users mostly stopped consuming *Cannabis* due to unfavourable experiences which could be attributed to lack of knowledge as to *Cannabis* usage. Furthermore, the majority of experimental *Cannabis* users were either unsure, or using *Cannabis* didn't meet their expectations or its use resulted in unfavourable experiences. This could also explain why experimental users only used *Cannabis* three times or less. However, the possibility of experimental *Cannabis* users continuing to use *Cannabis* (going from ≤3 times to ≥4 times) after having a good experience should also be considered. This probably would explain why frequent users and users as required mostly had good experiences from using *Cannabis*. Finally, participant methods of dosing were also compared as to the experiences of study participants and the majority of good experiences could be attributed to having an established dosing method. Again, not only does this reinforce the importance of consumer awareness regarding dosing but also could provide an opportunity for food product developers. Considering that *Cannabis* is often included in the practices of traditional medicine, food product developers may find value at targeting a *Cannabis*-infused snack towards this large group of potential *Cannabis*-infused snack consumers.

While exploring study participant willingness to consume a *Cannabis*-infused snack, a minority of participants were willing to try edibles unconditionally. These participants were either experimental or occasional users and stated that they would try edibles out of curiosity, for the possible health benefits or for convenience. However, half of the participants had conditions before consuming *Cannabis* - some would only consume an edible if it was regulated and verified, some required more information on benefits and risks beforehand whilst others stated they would only consider an edible if it could relieve a health issue or if it was consumed during leisure time. Alternatively, those study participants who were unwilling to consume a *Cannabis*-infused snack had a recreational aversion, fear of side effects, a lack of knowledge or stated that using *Cannabis* was against their morals and values. These reasons were especially prevalent amongst non-users. Some participants who had used *Cannabis* mentioned that edibles were not their preferred method of consuming *Cannabis* due to unpredictable effects or due to having an aversion to the organoleptic properties (smell and taste) of *Cannabis*.

In addition, this section reflects findings that may prove to be valuable for both retailers and food manufacturers when considering the development of products infused with *Cannabis*. Not only should the amount of active ingredients as well as consumer awareness be considered but also how the product would react when ingested. In addition, factors such as previous meals, body weight and metabolism may influence absorption time of the active phytocannabinoid, while there is concern that THC is more likely to cause adverse effects to the user. However, CBD toxicity is still likely with either overconsumption or distracted ingestion of CBD snacks so that food product developers should consider single serving edibles as a preventative measure. In addition, none of the participants mentioned that they would consume an edible based on the recommendation of a trusted source, such as a relative or family member. However, it was apparent that motives for consuming *Cannabis* and methods of dosage was especially based on the recommendation from a trusted source. Therefore, creating good user experiences from consuming a *Cannabis*-infused snack, based on consumer education, pleasant sensory properties and effects, would ultimately lead to more consumers recommending the edible.

These concluding comments support the assertion that this research study suitably addressed study objective 3 that was **to explore South African consumer perception/practice of fibre-type *Cannabis* and *Cannabis*-infused snack foods**.

6.4.4 The KAP model relating to *Cannabis* and the inclusion of *Cannabis* in snacks

The degree of study participant knowledge was evidently not only a deciding factor influencing participant attitudes toward *Cannabis* and *Cannabis*-infused snacks but also determined participant willingness to consume *Cannabis* edibles. In addition, participants with more *Cannabis* usage experience were more likely to possess better knowledge of *Cannabis*. Furthermore, applying the correct knowledge on the usage and dosing of *Cannabis* may result in more favourable experiences and consequently better attitudes.

When looking at perception/practice, some frequent *Cannabis* users stopped using *Cannabis* due to negative side effects while other frequent users continued to consume *Cannabis* due to good experiences. However, experiences from using *Cannabis* had some influence on participant attitudes but these were not always a consistent determining factor regarding participants' perception/practice of *Cannabis*. For instance, some occasional users could recall negative past experiences but did not necessarily stop using *Cannabis*. Similarly, alcohol consumption with *Cannabis* appears to have some negative side effects but people still continue using it to relax and socialise.

Finally, negative attitudes could be associated with a lack of knowledge and non-*Cannabis* use but was not always a determining factor. In addition, a specific age cohort might also influence consumer attitudes and consequently their knowledge and perception/practice of *Cannabis*. It was evident that participants with a noticeable negative attitude toward *Cannabis* also displayed a lack of knowledge regarding *Cannabis* and were more likely to not have consumed *Cannabis*. Equally, younger age was

associated with increased knowledge and attitudes towards *Cannabis* with a higher likelihood of such participants consuming *Cannabis*. Thus, the current study supports the fact that in relation to *Cannabis* and particularly towards *Cannabis*-infused snacks, the knowledge-attitude-perception/practice factors within the KAP model are interrelated and this this interaction does not necessarily happen sequentially.

Figure 6.1 illustrates an adjusted knowledge-attitude-perception/practice model that includes consumer age as an influential factor regarding *Cannabis* use and *Cannabis*-infused snacks as it emerged from the current study.

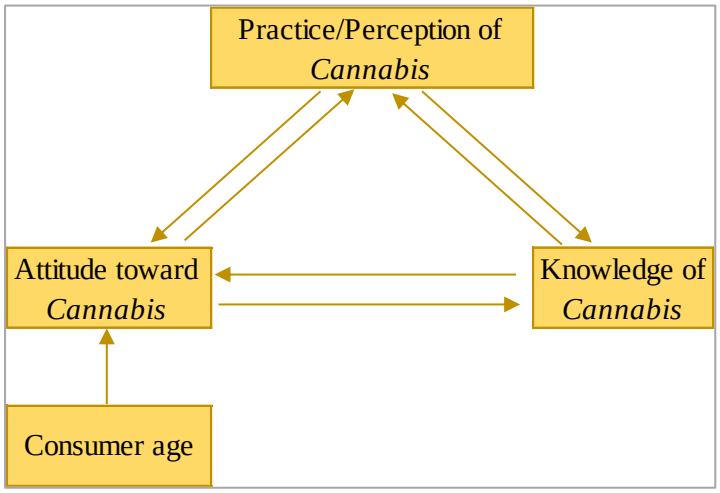

FIGURE 6.1: AMENDED CONCEPTUAL FRAMEWORK THAT EMERGED FROM THE CURRENT STUDY.

6.5 CONTRIBUTION OF THE STUDY

This study has contributed to the following:

6.5.1 Contribution to the body of knowledge on *Cannabis*

Currently, limited research exists as to consumer knowledge, attitudes and perception/practice of *Cannabis* amongst South African consumers. The current study contributes to the body of knowledge regarding *Cannabis* and what consumers comprehend, how they feel and their usage of *Cannabis*. The study determined that there were some participants who had good knowledge regarding *Cannabis* but that there was still a large knowledge gap amongst the majority of participants concerning *Cannabis*. In addition, this study revealed that the majority of consumers still negatively associated *Cannabis* with THC and its intoxicating effects. This was usually followed by negative attitudes toward *Cannabis* so that participants were reluctant to consider consuming *Cannabis*-infused snacks. Considering the potential nutritive and health benefits that may result from including hemp and its by-products in snacks, this study furthermore also highlighted the need for consumer awareness and education on the phytochemicals present in strains of *Cannabis*, especially hemp.

6.5.2 Contribution to the food industry

Current studies on consumer knowledge, attitudes and perception/practice of *Cannabis* have been mainly done on an international level and, according to the researcher's knowledge, such studies have not yet been conducted in South Africa. Based on the findings from this study, the food industry would gain from educating consumers on the subjects of hemp and CBD and their benefits. Not only should consumers be educated as to the differences between CBD and THC but also on dosing, health benefits and possible side effects. In addition, since consumers are becoming increasingly aware of the preservation of the environment, communicating the environmental benefits of the *Cannabis* industry could also promote acceptance of *Cannabis* and *Cannabis*-infused snacks amongst consumers. This study revealed that consumers do associate possible health and remedial benefits with *Cannabis*. Moreover, the majority of participants in the current study would be more open to consuming *Cannabis* for its health benefits as opposed to recreational applications. In addition, this study highlighted some important considerations for *Cannabis*-infused snacks such as the absorption time of phytochemicals, their appropriate dosing and sensory properties.

6.5.3 Contribution to the method of data collection

This study followed a qualitative research paradigm that was exploratory in nature. Since limited research data exist on consumer knowledge, attitudes and perception/practice of *Cannabis* and *Cannabis*-infused snacks, using an exploratory qualitative paradigm has proven to be valuable as a first step in understanding what consumers comprehend, how they feel and how they would potentially use *Cannabis* and *Cannabis*-infused snacks. In addition, the study paradigm did not limit/restrict participants and allowed the interview to progress until the researcher had an understanding of participant experiences.

Furthermore, participants were interviewed individually as well as in a homogenous focus group format. Although only 36 participants were involved in this research study, this relatively low figure is deemed acceptable in qualitative research as data collection stopped after data saturation were reached. Furthermore, this study has once again shown that individual interviews were invaluable in obtaining an in-depth understanding of consumers' knowledge, attitudes and perception/practice. In addition, this data-gathering method also showed itself to be suited for determining participant objective knowledge and assisting in putting participants at ease when discussing a potentially sensitive topic such as *Cannabis*. Apart from individual interviews, this study also used focus group discussions as a supplemental data gathering method. Thus, the two homogenous focus groups, one consisting of participants who had used *Cannabis* and the other consisting of participants had not used *Cannabis*. Again, this study showed the value in using homogenous focus groups to encourage participants to share their experience and contribute to the richness and depth of the study data.

6.6 LIMITATIONS OF THE STUDY

This research study represents only the first step towards exploring and, ultimately understanding consumer knowledge, attitudes and perception/practice regarding *Cannabis* and, specifically, the feasibility of incorporating *Cannabis* into snack foods. The participants involved in this study were, furthermore, recruited through a non-probability sampling strategy and only a small sample took part in the study. The participants that did take part in the study needed to have access to Microsoft Teams© which may have resulted in class bias. Furthermore, the majority of participants resided in Mpumalanga and Gauteng with no participants from South African provinces such as the Free State, North-West Province or the Northern Cape, and therefore were not representative of the South African population as a whole. Finally, it should be noted that the majority of participants in this study had a tertiary education, which is not representative of the average level of education amongst South Africans. Therefore, predicting consumer behaviour towards *Cannabis* and *Cannabis*-infused snacks cannot be extrapolated to the South African public based on the findings obtained from this research. Furthermore, even though interviews were held until the point of data saturation, in accordance with the research methodology, the number of participants who took part in this study is not large enough to confidently calculate consumer KAP of *Cannabis* and *Cannabis*-infused snack foods. This suggests the need for repeat studies involving a larger number of participants.

6.7 FUTURE RESEARCH

As indicated, since limited research exists on South African consumer knowledge, attitudes and perception/practice of *Cannabis* and *Cannabis*-infused snack foods, future research on this topic is vitally important. Firstly, the development of food products that contain *Cannabis* should be based on the views and opinions of South African consumers to ensure product success. Future research should therefore aim at including views of a larger sample that is representative of the South African population. Furthermore, quantitative studies could also be conducted that would assist with including a larger study population more representative of the South African population.

Future studies should focus on the benefits of *Cannabis*, not only when consumed but also the impact on the environment and economic potential of the *Cannabis* industry, from plant growth, through processing to product development. Likewise, the potential risks of *Cannabis* should also be investigated further as well as determining the appropriate instructions and dosing for *Cannabis* users. The findings from the current study suggest that some consumers are uninformed about hemp, especially when distinguishing hemp from marijuana. There are also some aspects of edibles that need to be considered, especially regarding absorption time, dosage and organoleptic properties. Product developers should also conduct trials on *Cannabis*-infused snacks to determine the accurate dosage of CBD in terms of user weight and age.

It was evident that younger generations were more open to consuming *Cannabis* and future research should target how older generations may obtain their information. In addition, it would be interesting to compare consumer attitudes toward and perception/practice of *Cannabis* before and after consumer education campaigns on the differences between hemp and marijuana. The next section discusses recommendations to marketers, manufacturers and retailers.

6.8 RECOMMENDATIONS

The findings from this study indicate that there is a need to create awareness of hemp and its phytochemicals. It became evident that consumers, especially Generations X and older, are mostly uninformed regarding *Cannabis* and have negative associations with *Cannabis*. These individuals should be reminded of the potentially benefit from *Cannabis* and *Cannabis*-infused products as the phytocannabinoids could aid in treating ailments commonly associated with older age. Food manufacturers, retailers and marketers should, however, be conscious of how consumers obtain their information regarding *Cannabis* and design their marketing strategies accordingly. Thus, recommendations can be made to retailers, marketers and manufacturers as follows:

- The consumption of nutritionally beneficial phytochemicals in *Cannabis* aligns with current health trends and this can contribute to a functional food that may be very effective in preventing non-communicable diseases.
- The environmental benefits regarding *Cannabis* should be effectively communicated to sensitise South Africans to such benefits and increase *Cannabis* knowledge amongst potential *Cannabis* consumers.
- The benefits of hemp seeds as a plant-based protein source should be communicated to consumers as this is currently on demand amongst consumers.
- Differences between fibre-type and drug-type *Cannabis* should be made clear to consumers.
- An urgent need exists for quality assured, validated and verified *Cannabis*- and *Cannabis*-infused products.
- The inclusion of safe and effective user instructions with such products are critical.
- Improved dosing methods should be considered and the maximum daily intake of *Cannabis* products determined and made clear to consumers.
- Single serving edibles should be considered to prevent overconsumption.
- Consumers are currently unaware that *Cannabis* contains various phytochemicals, which include THC and CBD that have potential beneficial properties outside of the long-associated intoxicating effects caused by THC.
- Various factors that may influence the absorption time of phytochemicals should be considered when developing an edible.
- Organoleptic properties of *Cannabis* may put some consumers off and should either be masked or optimised with complimentary flavours.

- Awareness amongst consumers should also be created in terms of potential risks concerning *Cannabis*, especially the risks associated with CBD and THC.
- Consumers are more likely to consume *Cannabis* when it is referred by a trusted source which should be considered for future marketing.
- Marketers should consider targeting consumers in Generation X and older age groups to facilitate their distinguishing between hemp and marijuana.

6.9 CONCLUSION

This chapter presents and discussed the main conclusions drawn from the findings of the study. The conclusions were presented according to the objectives of the study and future research opportunities were discussed along with the limitations and recommendations for food retailers, marketers and manufacturers. This study aimed to explore and create a basis of understanding of consumer knowledge of, their attitude toward and perception/practice of *Cannabis* and *Cannabis*-infused snack foods. In conclusion, stakeholders relevant to the *Cannabis* industry such as marketers, retailers, the government as well as the pharmaceutical and agricultural sectors should consider involving consumers during the development and evaluation stages of *Cannabis*-infused snacks as this would increase the likelihood of an acceptable and marketable end-product.

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APPENDICES APPENDIX A: ETHICS APPROVAL

UNISA university of south africa

UNISA-CAES HEALTH RESEARCH ETHICS COMMITTEE

Date: 08/03/2021

NHREC Registration # : REC-170616-051
REC Reference # : 2021/CAES_HREC/038
Name : Ms M Kruger
Student #: 69192855

Dear Ms Kruger

Decision: Ethics Approval from 04/03/2021 to 28/02/2024

Researcher(s): Ms M Kruger
69192855@mylife.unisa.ac.za

Supervisor (s): Dr TS Van Eeden
veedets@unisa.ac.za; 011-471-2171

Dr D Beswa
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Working title of research:

South African consumer knowledge, attitude and perception/practice (KAP) of cannabis-infused snack foods

Qualification: M Consumer Science

Thank you for the application for research ethics clearance by the Unisa-CAES Health Research Ethics Committee for the above mentioned research. Ethics approval is granted for three years, **subject to submission of yearly progress reports. Failure to submit the progress report will lead to withdrawal of the ethics clearance until the report has been submitted.**

The researcher is cautioned to adhere to the Unisa protocols for research during Covid-19.

Due date for progress report: 28 February 2022

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*The **low risk application** was **reviewed** by the UNISA-CAES Health Research Ethics Committee on 04 March 2021 in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment.*

The proposed research may now commence with the provisions that:

1. The researcher will ensure that the research project adheres to the relevant guidelines set out in the Unisa Covid-19 position statement on research ethics attached.
2. The researcher(s) will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.
3. Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study should be communicated in writing to the Committee.
4. The researcher(s) will conduct the study according to the methods and procedures set out in the approved application.
5. Any changes that can affect the study-related risks for the research participants, particularly in terms of assurances made with regards to the protection of participants' privacy and the confidentiality of the data, should be reported to the Committee in writing, accompanied by a progress report.
6. The researcher will ensure that the research project adheres to any applicable national legislation, professional codes of conduct, institutional guidelines and scientific standards relevant to the specific field of study. Adherence to the following South African legislation is important, if applicable: Protection of Personal Information Act, no 4 of 2013; Children's act no 38 of 2005 and the National Health Act, no 61 of 2003.
7. Only de-identified research data may be used for secondary research purposes in future on condition that the research objectives are similar to those of the original research. Secondary use of identifiable human research data require additional ethics clearance.
8. No field work activities may continue after the expiry date. Submission of a completed research ethics progress report will constitute an application for renewal of Ethics Research Committee approval.

Note:
*The reference number **2021/CAES_HREC/038** should be clearly indicated on all forms of communication with the intended research participants, as well as with the Committee.*

Yours sincerely,

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APPENDIX B: INDIVIDUAL INTERVIEW INFORMATION SHEET

UNISA university of south africa

Ethics clearance reference number: 2021/CAES_HREC/038

Research permission reference number: REC-170616-051

Title: South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis*-infused snack foods

DEAR PROSPECTIVE PARTICIPANT

My name is Marlize Krüger and I am doing research with Dr. T. van Eeden and Dr. D. Beswa at the University of South Africa, Department of Life and Consumer Sciences. We are inviting you to participate in a study entitled: ***South African consumer knowledge, attitude and perception/practice (KAP) of Cannabis-infused snack foods***.

WHAT IS THE PURPOSE OF THE STUDY?

The study is needed to fulfil the requirements for the award of Master of Consumer Science which may be published in an academic journal or presented at academic conferences. This study aims to explore the association between consumer knowledge, attitudes and practices relating to the inclusion of *Cannabis* in snack foods by means of a semi-structured one-on-one interview.

WHY AM I BEING INVITED TO PARTICIPATE?

The semi-structured interview guide has been designed to study the consumers' knowledge, attitude and perception/practice (KAP) of *Cannabis*-infused snack foods. You were selected to participate in this study because you have knowledge/ are familiar with the term "*Cannabis*". You will therefore be asked questions about your knowledge, attitude and perception/practice regarding "*Cannabis*". If you are below the age of 18 years you will not be permitted to take part in this study. By taking part in this interview, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings. The total number of participants in this study will be approximately 35 participants. Please note that the interview will be held on a digital platform and you may change your display name to a pseudonym to ensure your anonymity.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

This study will aim to explore participant attitudes, practices, knowledge and perceptions regarding *Cannabis* as an inclusion in snack foods. Participants will be asked open-ended questions, so there is no right or wrong answer. The interview will be digitally recorded and the duration of the interview is expected to last 30-45 minutes.

CAN I WITHDRAW FROM THIS STUDY EVEN AFTER I HAVE AGREED TO PARTICIPATE?

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You will be required to sign a consent form before partaking in the study, however, this will be voluntarily and you will be under no obligation to consent to partaking in the study. Participants are free to withdraw at any time during the interview without the obligation of giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

Your participation in this study will not benefit you directly, however, with the novelty of *Cannabis*, there are a lot of gaps between supplier and consumer. This study will aim to fill those gaps to ensure safer products that are tended to the needs of the consumer. You may find by sharing your experience with the researcher, that your participation is meaningful to you.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

The sampling methods as well as the data collection procedures will cause no harm to participants. There might, however be a slight inconvenience of taking up your time. Information gathered from the interview will be kept confidential by the researchers and will report on the findings from the perspective of the participating group and not from the perspective of an individual.

WILL THE INFORMATION I GIVE TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

All raw data obtained during this study will be stored on a password protected computer. Only the researcher and supervisors will have access to this information. Participation will, additionally, be anonymous and your name or other identifying information will not be relevant in the study, therefore, this information will not be included and your privacy will be maintained in all written or published data resulting from this study.

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There is a retention period of the data obtained during the study which will last for about five years. Once this period has expired, all data will be responsibly destroyed.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

No participants will receive incentives or payment, financial or otherwise.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Health Research Ethics Committee of the College of Agriculture and Environmental Sciences, UNISA. A copy of the approval letter can be obtained from the researcher if you wish to view this. You can report any serious unethical behaviour at the University's Toll Free Hotline 0800 86 96 93.

HOW WILL I BE INFORMED OF THE FINDINGS/RESULTS OF THE RESEARCH?

If you would like to be informed of the final research findings, please feel free to contact me or indicate that the information should be emailed to you and ensure that your email is known to the researcher.

Should you have concerns about the way in which the research has been conducted, you may contact Dr. Tertia van Eeden at, veedets@unsa.ac.za or at (011) 471 2171. Contact the research ethics chairperson of the CAES Health Research Ethics Committee, Prof MA Antwi on 011-670-9391 or antwima@unisa.ac.za if you have any ethical concerns.

CONTACT INFORMATION

If you have any questions, concerns and complaints please contact me:

Researcher:	Marlize Krüger
Email:	69192855@mylife.unisa.ac.za
Tel:	084 900 0777

APPENDIX C: FOCUS GROUP INFORMATION SHEET

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Ethics clearance reference number: 2021/CAES_HREC/038

Research permission reference number: REC-170616-051

Title: South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis*-infused snack foods

DEAR PROSPECTIVE PARTICIPANT

My name is Marlize Krüger and I am doing research with Dr. T. van Eeden and Dr. D. Beswa at the University of South Africa, Department of Life and Consumer Sciences. We are inviting you to participate in a study entitled: ***South African consumer knowledge, attitude and perception/practice (KAP) of Cannabis -infused snack foods***.

WHAT IS THE PURPOSE OF THE STUDY?

The study is needed to fulfil the requirements for the award of Master of Consumer Science which may be published in an academic journal or presented at academic conferences. This study aims to explore the association between consumer knowledge, attitudes and practices relating to the inclusion of *Cannabis* in snack foods by means of a semi-structured focus group that will consist of five to eight participants.

WHY AM I BEING INVITED TO PARTICIPATE?

The questions is intended to study the consumers' knowledge, attitude and perception/practice (KAP) of *Cannabis* -infused snack foods. You will therefore be asked questions about your knowledge, attitude and perception/practice regarding "*Cannabis*" in a group setting. You were selected to participate in this focus group because you have knowledge/ are familiar with the term "*Cannabis*". If you are below the age of 18 years you will not be permitted to take part in this study. By taking part in this focus group, you agree that the information you provide may be used for research purposes, including dissemination through peer-reviewed publications and conference proceedings. The total number of participants in this study will be approximately 35 participants. Due to the group setting confidentiality cannot be guaranteed outside of the focus group, since the researcher has limited control over what participants share outside of the focus group. Please note that focus groups will be held on a digital platform and you may change your display name to a pseudonym to ensure your anonymity.

WHAT IS THE NATURE OF MY PARTICIPATION IN THIS STUDY?

This study will aim to explore participant attitudes, knowledge and practices/ perceptions regarding *Cannabis* as an inclusion in snack foods. Participants will be asked open-ended questions, so there is no right or wrong answer. The focus group will be digitally recorded and the duration of the focus group is expected to last 45-60 minutes.

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CAN I WITHDRAW FROM THIS STUDY EVEN AFTER I HAVE AGREED TO PARTICIPATE?

You will be required to sign a consent form before partaking in the study, however, this will be voluntarily and you will be under no obligation to consent to partaking in the study. Participants are free to withdraw at any time during the focus group without the obligation of giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

Your participation in this study will not benefit you directly, however, with the novelty of *Cannabis*, there are a lot of knowledge gaps between supplier and consumer. This study will aim to fill those knowledge gaps to ensure safer products that are tended to the needs of the consumer. You may find by sharing your experience with the researcher, that your participation is meaningful to you.

ARE THERE ANY NEGATIVE CONSEQUENCES FOR ME IF I PARTICIPATE IN THE RESEARCH PROJECT?

The sampling methods as well as the data collection procedures will cause no harm to participants. There might, however be a slight inconvenience of taking up your time. Information gathered from the focus group will be kept confidential by the researchers and will report on the findings from the perspective of the participating group and not from the perspective of an individual.

WILL THE INFORMATION I GIVE TO THE RESEARCHER AND MY IDENTITY BE KEPT CONFIDENTIAL?

You have the right to insist that your name will not be recorded anywhere and that no one, apart from the researcher and identified members of the research team, will know about your involvement in this research. Your name will not be recorded anywhere and no one will be able to connect you to the answers you give. Your answers will be given a code number or a pseudonym and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings.

Your answers may be reviewed by people responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Review Committee. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records.

HOW WILL THE RESEARCHER(S) PROTECT THE SECURITY OF DATA?

All raw data obtained during this study will be stored on a password protected computer. Only the researcher and supervisors will have access to this information. Participation will, additionally, be anonymous and your name or other identifying information will not be relevant in the study, therefore,

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All raw data obtained during this study will be stored on a password protected computer. Only the researcher and supervisors will have access to this information. Participation will, additionally, be anonymous and your name or other identifying information will not be relevant in the study, therefore, this information will not be included and your privacy will be maintained in all written or published data resulting from this study.

There is a retention period of the data obtained during the study which will last for about five years. Once this period has expired, all data will be responsibly destroyed.

WILL I RECEIVE PAYMENT OR ANY INCENTIVES FOR PARTICIPATING IN THIS STUDY?

No participants will receive incentives or payment, financial or otherwise.

HAS THE STUDY RECEIVED ETHICS APPROVAL

This study has received written approval from the Health Research Ethics Committee of the College of Agriculture and Environmental Sciences, UNISA. A copy of the approval letter can be obtained from the researcher. You can report any serious unethical behaviour at the University's Toll Free Hotline 0800 86 96 93.

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Should you have concerns about the way in which the research has been conducted, you may contact Dr. Tertia van Eeden at, veedets@unsa.ac.za or at (011) 471 2171. Contact the research ethics chairperson of the CAES Health Research Ethics Committee, Prof MA Antwi on 011-670-9391 or antwima@unisa.ac.za if you have any ethical concerns.

CONTACT INFORMATION

If you have any other questions, concerns and complaints please contact me:

Researcher: Marlize Krüger
Email: 69192855@mylife.unisa.ac.za
Tel: 084 900 0777

APPENDIX D: INDIVIDUAL INTERVIEW CONSENT FORM

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CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and I am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the one-on-one interview.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……..Date……

Researcher's Name & Surname……MARLIZE KRÜGER…… (please print)

Researcher's signature……..Date……07.10.2021……

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APPENDIX E: FOCUS GROUP CONSENT FORM

UNISA university of south africa

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____ (participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet.

I have had sufficient opportunity to ask questions and I am prepared to participate in the study.

I understand that my participation is voluntary and that I am free to withdraw at any time without penalty (if applicable).

I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential unless otherwise specified.

I agree to the recording of the focus group.

I have received a signed copy of the informed consent agreement.

Participant Name & Surname…… (please print)

Participant Signature……..Date……

Researcher's Name & Surname……MARLIZE KRÜGER…… (please print)

Researcher's signature……..Date…02.11.2021……

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APPENDIX F: TURNITIN RECEIPT

turnitin

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This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

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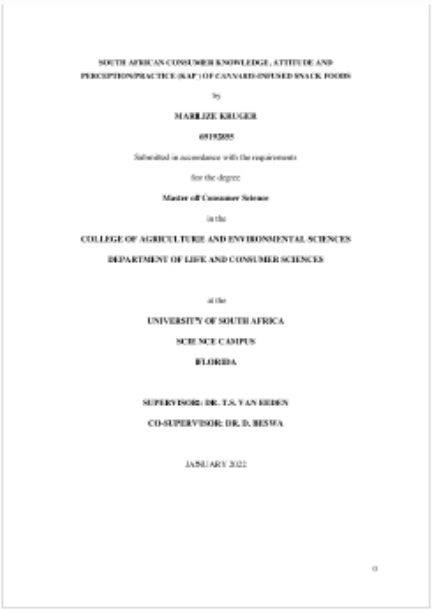
Submission title:	SOUTH AFRICAN CONSUMER KNOWLEDGE, ATTITUDE AND P...
File name:	M_Kruger_Dissertation.docx
File size:	7.59M
Page count:	246
Word count:	84,289
Character count:	494,431
Submission date:	21-Jan-2022 09:29AM (UTC+0200)
Submission ID:	1745287761



SOUTH AFRICAN CONSUMER KNOWLEDGE, ATTITUDE AND PERCEPTION/PRACTICE (KAP) OF CANNABIS-INFUSED SNACK FOODS

by

MARLIZE KRUGER

69193885

Submitted in accordance with the requirements

for the degree

Master of Consumer Science

in the

COLLEGE OF AGRICULTURE AND ENVIRONMENTAL SCIENCES

DEPARTMENT OF LIFE AND CONSUMER SCIENCES

at the

UNIVERSITY OF SOUTH AFRICA

SCIENCE CAMPUS

FLORIDA

SUPERVISOR: DR. T.S. VAN EEDEN

CO-SUPERVISOR: DR. D. BESWA

JANUARY 2022

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APPENDIX G: PERMISSION TO EDIT IMAGE

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I, Lynmarie Griffioen (the "Releaser"), hereby grant permission and give my consent to Marlize Krüger (the "User"), with student number 69192855 at the University of South Africa, for the use and recreation of my electronic media image as identified below for the use in the Master's dissertation entitled "**South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis*-infused snack foods**".

Releaser signature _____ Date 6 Jan 2022

User signature _____ Date 03.01.2022

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APPENDIX H: INDIVIDUAL INTERVIEW GUIDE

What is your outlook on or attitude towards *Cannabis*? Positive or negative and why?

How do you feel about the South African legislation regarding *Cannabis*?

Have you ever consumed Cannabis or products infused with *Cannabis*?

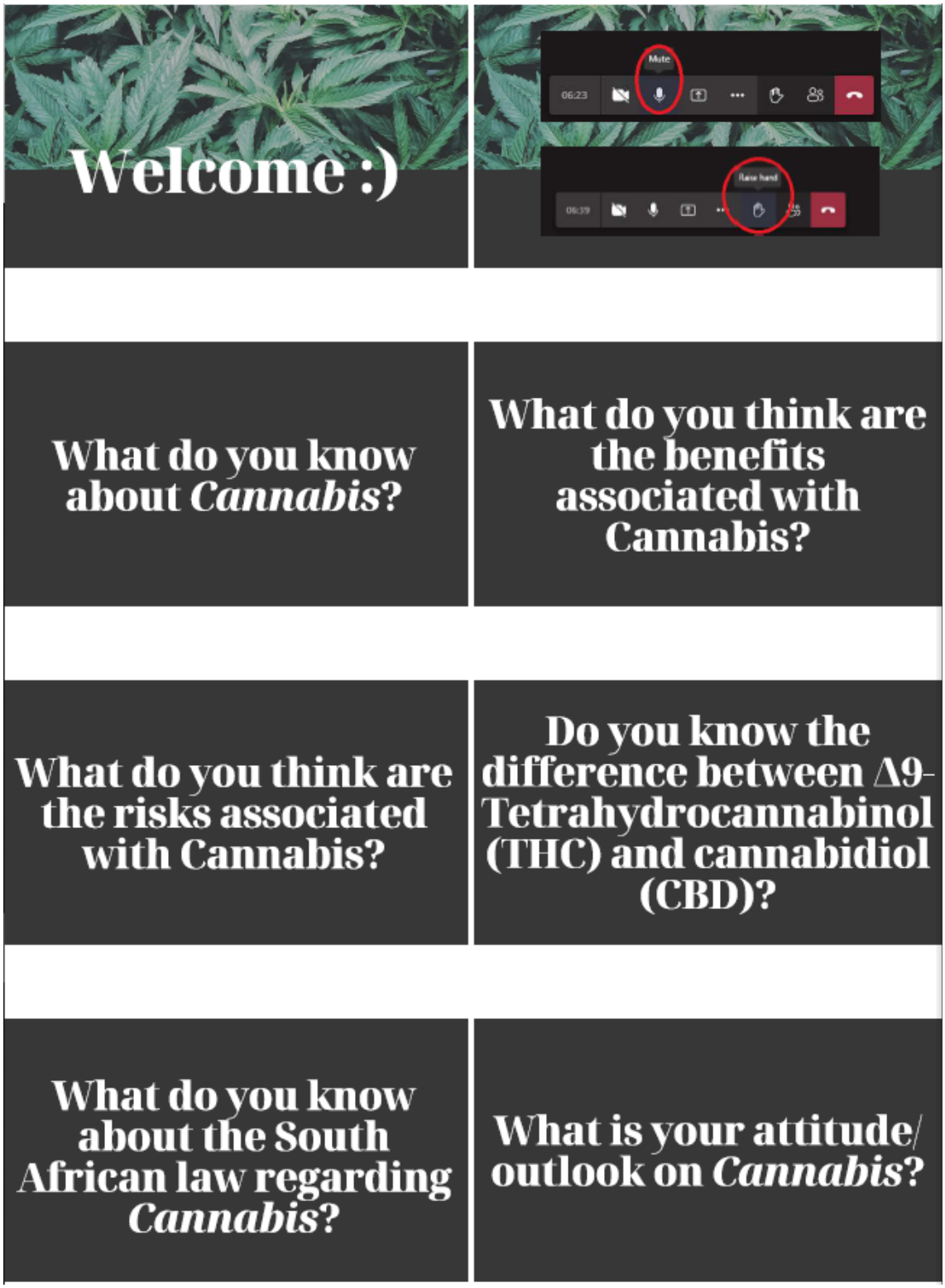
If no, what was the reason?

If yes:
1. What was the reason?
2. What was the method of consuming *Cannabis*?
3. How often do you consume *Cannabis*?
4. Did you know how to use the *Cannabis*, and if so, how did you go about with determining the dosage?
5. What was your experience with *Cannabis*? Why or why not did it meet or not meet your expectations?

Would you consume a snack infused with an ingredient derived from *Cannabis*?

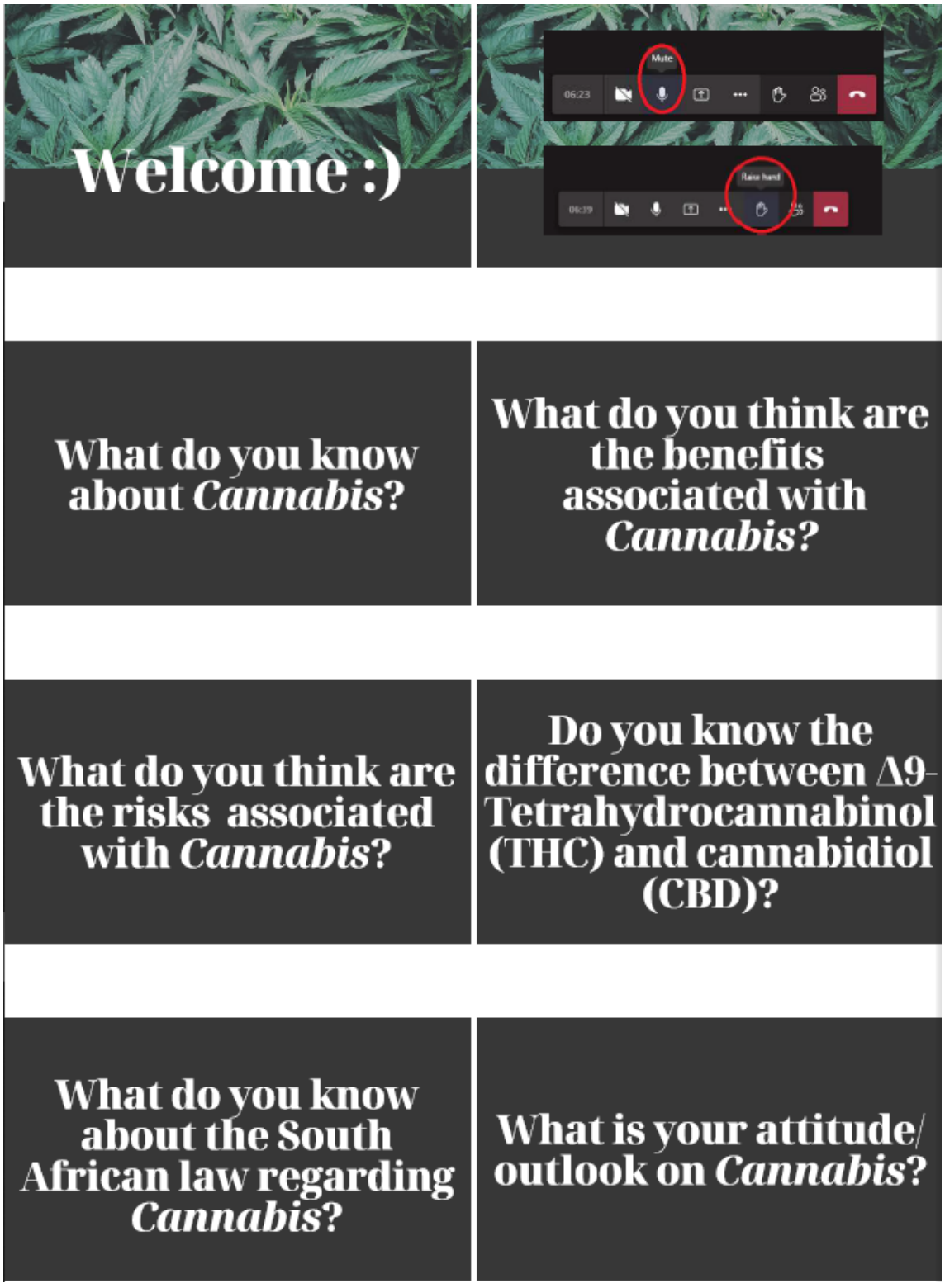
Thank You!

APPENDIX I: FOCUS GROUP MODERATOR GUIDE – USERS




How do you feel about the South African law regarding *Cannabis*?
Have you ever consumed *Cannabis* or products infused with *Cannabis*?
1. What was the reason?
2. What was the method of consuming *Cannabis*?
3. How often do you consume *Cannabis*?
4. Did you know how to use the *Cannabis*, and if so, how did you go about with determining the dosage?
5. What was your experience with *Cannabis*? Why or why not did it meet or not meet your expectations?
For the purpose of the focus group, the word "snack" will be referred to as a helping of food eaten outside of traditional mealtimes known as breakfast, lunch or dinner which is eaten for the purpose of satisfying hunger. Would you consume a snack food containing *Cannabis*? Why/ Why not?
Is there anything else you would like to add about *Cannabis* that you might not have mentioned previously?
Thank You!

APPENDIX J: FOCUS GROUP MODERATOR GUIDE – NON-USERS



How do you feel about the South African law regarding *Cannabis*?

What was the reason for not consuming *Cannabis*?

For the purpose of the focus group, the word "snack" will be referred to as a helping of food eaten outside of traditional mealtimes known as breakfast, lunch or dinner which is eaten for the purpose of satisfying hunger. Would you consume a snack food containing *Cannabis*? Why/ Why not?

Is there anything else you would like to add about *Cannabis* that you might not have mentioned previously?

Thank You!

APPENDIX K: LANGUAGE EDITING CERTIFICATE

John Dewar Tel: +27833210844

PhD, DAHM Email: johndewar65@gmail.com

Dear Dr van Eeden,

This letter is to confirm that I completed a language and content edit of a dissertation prepared by Ms Marlize Krüger entitled: **South African consumer knowledge, attitude and perception/practice (KAP) of *Cannabis*-infused snack foods**. This dissertation describes a research study under your supervision and will be presented to the Department of Life and Consumer Sciences, College of Agriculture and Environmental Sciences, University of South Africa in fulfilment for the requirements for the degree Master in Consumer Science.

My edit included the following:

- Spelling and grammar
- Vocabulary and punctuation
- Sentence structure and word usage
- Checking of in-text references
- Recommended inclusion of references within text

Text formatting included:

- Suggesting inclusion of in-text references in Problem Statement in Chapter 1
- Adjusting legend of some figures and tables in Chapter 2
- Suggesting introduction of "Cannabis-infused snacks" in first two sections of Chapter 6
- Adjusting format of study conclusions to directly address study objectives

Yours sincerely,

John Dewar

21st January 2022